Confederated Tribes of the Umatilla Indian Reservation

Range Management Plan

November 2022

For Information, Contact:

Range, Agriculture, and Forestry Program

Department of Natural Resources

Confederated Tribes of the Umatilla Indian Reservation

46411 Timíne Way

Pendleton, OR 97801

(541)429-7200

CERTIFICATE

The undersigned, N. Kathryn Brigham and Sally Kosey hereby certify that they are the Chair and Secretary, respectively, of the Board of Trustees of the Confederated Tribes of the Umatilla Indian Reservation, and at a regular meeting of said Board of Trustees at the Board Chambers of the Nixyáawii Governance Center, Mission, Oregon, on the 19th day of December, 2022, a quorum of said Board was present and the following Resolution was regularly moved, seconded, and adopted by a vote of 6 for, 0 against, and 0 abstaining.

RESOLUTION

WHEREAS, the Board of Trustees is the governing body of the Confederated Tribes of the Umatilla Indian Reservation (Confederated Tribes) by the authority of Article VI, Section 1 of the Constitution and Bylaws of the Confederated Tribes, adopted on November 4, 1949 and approved on December 7, 1949, as amended; **AND**

WHEREAS, pursuant to Article VI, Section 1(b) of the Constitution and Bylaws, the powers of the Board of Trustees include the authority "to manage all affairs of the Confederated Tribes, including the administration of tribal lands, funds, timber and other resources, under appropriate contracts, leases, permits and loan or sale agreements"; **AND**

WHEREAS, consistent with the American Indian Agricultural Resource Management Act, the Bureau of Indian Affairs (BIA) and the Confederated Tribes' Department of Natural Resources have prepared a Rangeland Management Plan Environmental Assessment (RMP EA), attached hereto as Exhibit 1, in compliance with the National Environmental Policy Act (NEPA) of 1969 and other relevant tribal, federal, laws and regulations.; **AND**

WHEREAS, the RMP EA was prepared to meet the BIA's NEPA responsibilities in developing the Rangeland Management Plan and analyzing the potential impacts of its associated activities under the federal action to meet the primary need of rangeland management on the Umatilla Indian Reservation; **AND**

WHEREAS, an Interdisciplinary Team (IDT), comprised of the Department of Natural Resources, Range, Agriculture and Forestry, Water Resources, Wildlife, Fisheries, Cultural Resources Protection, First Food Policy Programs, the Department of Economic and Community Development, Lands Program, the Planning Department and Bureau of Indian Affairs, Fire Program, established for the purpose of overseeing the development of the RMP and associated EA, developed the goals, objectives, standards and guidelines, and recommended a preferred alternative; **AND**

WHEREAS, the RMP EA has been completed by the contractor, BIA and the Confederated Tribes and was presented to the Board of Trustees at a work session held November 2, 2022; **AND**

WHEREAS, the RMP EA was reviewed by the following committees/commissions:

Tribal Water Commission (April 13, 2021 and April 5, 2022)
Fish and Wildlife Commission (April 13, 2021 and April 26, 2022)
Land Protection Planning Commission (April 27, 2021 and April 12, 2022)
Economic and Community Development Committee (April 6, 2021 and April 19, 2022)
Cultural Resources Committee (April 6, 2021 and April 19, 2022)
Tiicham Conservation District (April 12, 2022);
Land Acquisition Committee (April 6, 2021 and April 5, 2022); **AND**

WHEREAS, the Fish and Wildlife Commission, Land Protection Planning Commission, Economic and Community Development Committee, Cultural Resource Committee and Land Acquisition Committee voted in support of Alternative C and the Water Commission and Tiicham Conservation District did not vote on support of a management alternative; **NOW, THEREFORE, BE IT**

RESOLVED, that the Board of Trustees selects the Preferred Alternative C from the Rangeland Management Plan Environmental Assessment as developed jointly by the Bureau of Indian Affairs and the Confederated Tribes through the Interdisciplinary Team and hereby adopts the associated Rangeland Management Plan and directs appropriate staff to implement the Rangeland Management Plan, attached hereto as Exhibit 2; **AND BE IT FURTHER**

RESOLVED, that at least every 10 years, staff of the Bureau of Indian Affairs and Confederated Tribes shall review the Rangeland Management Plan with the Board of Trustees to determine whether it remains consistent with the Confederated Tribes' goals for rangeland management on the Umatilla Indian Reservation; **AND BE IT FINALLY**

RESOLVED, that the Board of Trustees authorizes its Chair to sign the necessary documents for the Confederated Tribes and Bureau of Indian Affairs to adopt and implement the Rangeland Management Plan;

AND, that said Resolution has not been modified amended or repealed and is still in full force and effect.

DATED this 19th day of December, 2022.

N. Kathryn Brigham, Chair
Board of Trustees

A T T E S T:

for: Sally Kosey, Secretary
Board of Trustees

Exhibit 1: **Rangeland Management Plan Environmental Assessment**
Exhibit 2: **Rangeland Management Plan**

NAME	YES	NO	ABSTAIN	LEAVE
N. Kathryn Brigham, BOT Chair				
Aaron Ashley, BOT Vice Chair	X			
Sandra Sampson, BOT Treasurer	X			
Sally Kosey, BOT Secretary				Personal
Toby Patrick, BOT Member				Personal
Lisa Ganuelas, BOT Member	X			
Corinne Sams, BOT Member	X			
Boots Pond, BOT Member	X			
Lindsey Watchman, General Council Chair	X			

UMATILLA INDIAN RESERVATION
RANGELAND MANAGEMENT PLAN

APPROVED BY:

M. Kathryn Brigham

12/19/22

CHAIRMAN, BOARD OF TRUSTEES
CONFEDERATED TRIBES OF THE
UMATILLA INDIAN RESERVATION

DATE

MICHAEL JACKSON

Digitally signed by MICHAEL JACKSON
Date: 2022.12.21 14:26:35 -08'00'

SUPERINTENDENT, UMATILLA AGENCY
BUREAU OF INDIAN AFFAIRS

DATE

Digitally signed by BRYAN MERCIER
Date: 2023.01.19 11:29:42 -08'00'

REGIONAL DIRECTOR, NORTHWEST REGION
BUREAU OF INDIAN AFFAIRS

DATE

Executive Summary

Introduction

The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) established by the Treaty of June 9, 1855, 12 Statute 945, between the United States and the Cayuse, Umatilla, and Walla Walla Tribes lies along the foothills of the Blue Mountains in northeastern Oregon. The Treaty was subsequently ratified by Congress on March 8, 1859. The Umatilla Indian Reservation (UIR) covers a variety of terrain and land uses including rough, uneven forest and rangelands, gently sloping agricultural fields, and long narrow floodplains supporting riparian vegetation. The Blue Mountains border the UIR to the east and the city of Pendleton lies to the west.

The Blue Mountain Slope and Blue Mountain Uplands contain true grasslands, shrub-grasslands, and forest stringers. The poor condition of plant communities in many parts of the UIR is a result of prolonged heavy grazing and the introduction of exotic annual grasses. This occurred mostly in the period extending from the 1880s to the 1920s when large number of sheep, cattle, and horses were grazed. There were also stock driveways that continued through the 1930s that were used by non-Indians to herd livestock across Indian lands to areas adjacent to the UIR. Preferred forage plants have diminished and have been replaced by less preferred plants. Narrative reports indicate that attempts to balance forage supply with livestock numbers have resulted in substantial reductions in livestock numbers since the establishment of the UIR

Purpose and Need

The American Indian Agricultural Resource Management Act of 1993, as amended, Title 25 United States Code (USC) § 3701 et seq., mandates the protection, conservation, utilization, and maintenance of the highest productive potential on Indian agricultural lands through the application of sound conservation practices and techniques. These practices and techniques shall be applied to the planning, development, inventorying, classification, and management of agricultural resources. Agricultural resources must be managed consistently with integrated resource management plans to protect and maintain other values such as wildlife, fisheries, cultural resources, water, and soil resources. Assistance must be provided to trust and restricted Indian landowners in leasing their rangelands lands for a reasonable annual return, consistent with prudent management and conservation practices, and community goals as expressed in the tribal management plans and appropriate tribal ordinances. To meet the objectives, a 10-year Indian rangeland resource management and monitoring plan must be developed and implemented. Periodic review (10 years) of the plan must be completed to maintain applicability or adapt to changing conditions.

The CTUIR continues to depend on natural resources for the development of a strong, diversified economy while preserving cultural, subsistence, and aesthetic values. Fishing, hunting, and gathering of roots and berries, are deeply valued within the Tribal social structure. For CTUIR to exercise Tribal Treaty rights and express cultural values, watersheds and floodplains must be ecologically healthy and capable of sustaining robust communities of First Foods in part supported by a healthy structure, pattern, and function of vegetation. The harvesting, processing, manufacturing, and marketing of farm, forest, livestock, and mineral products provide income to landowners and the CTUIR.

The Range Management Plan (RMP) is intended to apply to all Allotted, Tribal Trust, and Tribal fee lands regardless of whether or not the lands are within the original reservation boundary. The RMP will also influence the use of non-tribal Fee lands that are fenced with trust lands to form management units. Management of these non-tribal fee tribal fee lands cannot conflict with management of the trust or tribal fee lands. For example, livestock grazing on non-Indian fee lands that are fenced with Indian lands within range units must be managed consistently with requirements outlined for trust rangelands. In total, CTUIR managed lands encompass 90,324 acres of steppe vegetation and grazable woodlands.

Issues and Concerns

A preliminary list of issues and concerns were identified during a meeting of an Interdisciplinary Team (IDT) comprised of staff from the Department of Natural Resources, the Department of Economic and Community Development, and the Office of Information Technology of the CTUIR, as well as from the BIA Wildland Fire Program on March 18, 2021. These issues and concerns were further refined during subsequent meetings with the Cultural Resources Committee on April 6, 2021, the Economic and Community Development Committee on April 6, 2021, the Land Acquisition Committee on April 6, 2021, the Fish and Wildlife Commission on April 13, 2021, the Water Commission on April 20, 2021, and the Land Protection Planning Commission on April 27, 2021. These meetings were part of the process to develop a RMP for the UIR. In addition, the IDT published an article in the Confederated Umatilla Journal in April 2021, inviting participation from individuals interested in or potentially affected by the development of the RMP.

As a result of these efforts, the IDT identified issues and concerns associated with the following categories as significant to the development of the RMP.

1) First Foods

2) Water Quality/Instream and Riparian Ecosystems

3) Threatened, Endangered, and Candidate Fish and Wildlife Species

4) Wildlife/Wildlife Habitat

5) Upland Plant Community Composition/Invasive Plants

6) Climate Change

7) Historic Properties/Traditional Uses

8) Livestock Grazing as a Vegetation Management Tool (Targeted Grazing)

9) Livestock Grazing as an Economic Development Opportunity and as a Means to Generate Income for Landowners

10) Transportation System

11) Fire Management

12) Monitoring and Evaluation

13) Implementation Costs and Needs

Management Direction – Targeted Vegetation Management with Livestock Grazing

The CTUIR would actively manage rangeland vegetation through biological, cultural, and chemical methods to move resource conditions toward the desired future conditions for rangeland health as defined by the goals and objectives. Steps in the planning for vegetation management on a specific site include (1) assessing vegetation status (2) identifying causes of invasive plant invasion and/or processes not functioning, (3) using ecological principles to guide decision-making, (4) choosing appropriate tools and strategies based on the ecological principles, and (5) designing and executing a plan using adaptive management. In addition, the CTUIR would use livestock grazing as a vegetation management tool and as a means to encourage economic development for the CTUIR and its members.

General management activities include manual and mechanical tillage, prescribed fire use, biological and chemical control of invasive plants, targeted livestock grazing to reduce invasive plant competition with native plants, and native plant reestablishment. These general techniques would be applied to specific areas to eliminate or reduce resource impacts that natural succession alone would not resolve. The treatment methods used would depend on several important criteria that include: (1) the characteristics of the target species (distribution, density, and life cycle); (2) associated plant species; (3) the size, slope, accessibility and soil characteristics of the area to be treated; (4) weather conditions present at the time of treatment; (5) the proximity of the area targeted for vegetation treatment to sensitive and cultural areas; (6) the need for subsequent re-vegetation; and (7) the time of year treatment could occur.

Restoration of a site implies that in addition to re-establishing vegetative cover, the site be returned to pre-disturbance conditions and generally occupied by native plant communities. Objectives of a restoration plan to accomplish this task include: (1) use of reference sites to define the appropriate native plant community; (2) definition of the plant community composition and relevant structural information (cover, height); and (3) definition of the length of time required for compositional and structural restoration based on the appropriate plant community.

It is likely that the CTUIR would have to use a combination of techniques to restore native grasslands now dominated by exotic annual grasses. Successfully establishing native perennial grass seedlings in stands that support less than 5-10% perennial grass cover may require burning annual grasses to provide a suitable seedbed. Prior to seeding, one or more chemical treatments may be required to kill young annual grasses sprouting in the burned or tilled area.

Manual Treatments

Manual treatments are most effective as a means of treating small, isolated patches of annual or biannual undesired plant species that do not have an established seed bank and do not re-sprout from root fragments. Workers would cut plants above ground level, pull, grub, or dig out root systems to prevent subsequent regrowth, or otherwise enhance site conditions for desired plants. Plants should be pulled when soils are moist and before seeds are produced. A variety of hand tools could be employed. Manual treatments are often ineffective for the control of perennial or rhizomatous species or those with deep and/or easily broken roots.

Mechanical Treatments

Wheel tractors, crawler type tractors, or specially designed vehicles with attached implements would be used to treat vegetation. The best mechanical method for treating undesired plants in a particular location depends on the following factors: (1) characteristics of undesired species; (2) topography and terrain; (3) soil characteristics i.e., type, depth, amount and size of rocks, erosive nature, and susceptibility to compaction; and (4) climatic conditions. Mowing can be an effective weed management tool if timed to prevent or greatly reduce seed production (Sheley et al. 2017). Mowing may also be used to deplete root reserves. Tilling and disking may be used to mechanically remove undesired plant species.

Prescribed Fire

Prescribed fire is the planned application of fire in its natural or modified state under specific conditions of fuels, weather, and other variables to allow the fire to remain in a predetermined area and to achieve site-specific fire and resource management objectives. Each treatment requires specific burn plans with measurable burn goals that clearly define operational procedures for implementation, monitoring, available contingency resources, and response to fire escapes. Management objectives of prescribed fire would include the control of certain species and enhancement of the growth, reproduction, or vigor of certain species. Prescribed fire is often most effective when conducted just before flower or seed set or at the young seedling or sapling stage for trees and shrubs. Prescribed fire can also be an effective tool for removing thatch in dense, invasive annual grass infestations prior to herbicide application. Treatments must be implemented in accordance with procedures outlined in the Interagency Prescribed Fire Planning and Procedures Guide published by the National Wildfire Coordinating Group.

Biological Control

Biological control refers to the intentional release of organisms, including plant-eating insects, nematodes, mites, or pathogens that attack specific invasive weed species. Biological control agents are used to manage invasive weed populations by reducing the population to an acceptable background level, stressing target plants, and reducing competition with desirable plant species. While biological control agents are not effective for eradicating weed infestations, they can reduce populations below damaging thresholds and hinder further spread. Particular insects or combinations of insects may be introduced into an area of competing or undesired vegetation to selectively feed upon or infect target plants and reduce their density. One specific biological control agent generally may not reduce the target plant density to the desired level of control. In most instances, a complex of biological control agents must reduce the target plant density to an acceptable level.

Herbicide Applications

A wide variety of herbicides can be used to prevent the establishment and/or spread of undesired plant species. These chemicals vary widely in their mode of action, toxicity, non-target effects, and environmental effects. Herbicides can be applied using ground-based or aerial methods. Ground-based methods include backpack foliar sprayers with hand-held wands, wicks, and truck- or all-terrain vehicle (ATV) mounted spraying systems. The method of application depends on several variables including (1) treatment objective (removal or reduction), (2) the accessibility, topography and size of the treatment area, (3) the characteristics of the target species and the desired vegetation, (4) the anticipated costs and equipment limitations, (5) the location of sensitive areas in the immediate vicinity, and (6) the meteorological and vegetative conditions of the treatment area at the time of application. Backpack sprayers are effective for small areas, areas inaccessible by vehicles, and for spot treatment of invasive weeds interspersed with desirable plant species. Backpack sprayers can target specific plants, thereby minimizing impacts on non-target species. Wicks can be used to target specific weeds and minimize spray on non-target plants. Truck- or ATV-mounted spraying systems are more efficient than backpack spraying for large infestations and infestations located adjacent to roads and trails. Aerial herbicide applications can be conducted with helicopters or fixed-wing aircraft. In non-agricultural areas, aerial herbicide applications will generally be limited to large infestations that are inaccessible using ground-based methods.

Targeted Grazing

Targeted grazing is the application of a specific kind of livestock at a determined season, duration, and intensity to accomplish defined vegetation or landscape goals. The shift in emphasis from good grazing management to targeted grazing is that targeted grazing refocuses outputs of grazing from livestock production to vegetation and landscape enhancement. Targeted grazing should be considered as another tool for constructing desirable ecosystems. It can and should be used in combination with other technologies, such as burning, applying herbicides, and seeding native plants. Most of these traditional management tools have significant economic, ecological, or social implications that limit their application.

Effective grazing programs for vegetation control require a clear statement of the kind of animal, timing, and rate of grazing necessary to suppress troublesome plants and maintain healthy landscapes. A successful grazing prescription should: (1) cause significant damage to the target plant; (2) limit damage to the surrounding vegetation; and (3) be integrated with other control methods as part of an overall landscape management strategy. Effective grazing programs for vegetation management require a clear understanding of the kind of an animal's inherited and developed preferences for plants as well as the timing and rate of grazing necessary to suppress undesired plants and maintain healthy landscapes.

A targeted grazing prescription must specify the time grazing should be applied for maximum impact. This optimum time for the application of targeted grazing as a vegetation management technique is when the target plants are most susceptible to damage by grazing and when they are most palatable to livestock. How acceptable or palatable a plant is depends in part on the plant's nutritive characteristics. The nutritive value or potential toxicity of plants varies throughout the growing season. Most plants are highly digestible and nutritious when they are young, and they become less nutritious as the season advances. It is also critical to apply grazing at a time of year when the target plant is susceptible to damage from defoliation. Plants are generally most susceptible to grazing prior to seed formation. Enticing livestock to eat and cause damage to specific target plants requires careful selection of the time of year to apply grazing.

The CTUIR would commit to the development and implementation of management unit plans for all grazing units including the identification of prescribed grazing systems. The NRCS, BIA, and CTUIR would fund the range improvements required to implement these management plans. As part of the process for developing the grazing unit technical plans, the CTUIR would actively seek opportunities to adjust unit boundaries to incorporate small tracts not currently within the units. The CTUIR believes that incorporation of the small tracts currently under lease as pastures would offer greater flexibility and opportunity to meet resource objectives.

Livestock Grazing as an Economic Development Opportunity and as a Means to Generate Income for Landowners

Consistent with the process for awarding grazing privileges on trust lands, the BIA and CTUIR will encourage the use of Indian owned rangeland resources by members of the CTUIR either as individual operators, operators who have formed a livestock cooperative or a Tribal livestock enterprise.

The management direction provides a minimum of $110,634.00 per year for Indian landowners based on a minimum acceptable rate of $16.00-17.00 per Animal Unit Month (AUM).

Adaptive Management

The fundament principle of adaptive management is that our knowledge of ecological systems is incomplete introducing risk and uncertainly in our ability to manage natural resources. Adaptive management, or the continual process that ensures that management strategies will be adjusted to meet goals and objectives through planning, implementation, monitoring, and evaluation will be used throughout implementation. Adaptive management emphasizes flexibility necessary to make adjustments while ensuring results. A continual feedback loop based on new information allows for mid-course corrections to grazing schedules, standards and guidelines, and underlying assumptions to meet planned goals and objectives. Adaptive Management requires three types of information: short- and long-term monitoring data, knowledge of potential drivers to changes in vegetation composition and structure, and clearly defined predictions of management effects.

Monitoring and Evaluation

Monitoring is a critical part of the adaptive management cycle. The process of restoring and maintaining ecosystem function is implemented through management actions on a site-specific basis. Whether or not management actions are achieving the stated goals and objectives and the landscape is moving toward the desired future condition will be determined by the monitoring of vegetation composition and structure as well as forage utilization by ungulates at specific sites. The result of these monitoring efforts will then be evaluated at the landscape level to determine the overall rangeland health. The conclusions reached will also be used to make recommendations on whether to continue current management or to change management practices to meet goals and objectives.

Implementation Costs and Needs

The CTUIR estimates that one rangeland management specialist would be required to plan and implement vegetation treatments and one range technician would be required to implement targeted livestock grazing. The base funding estimate of $159,960 should be considered a re-occurring cost. Restoration of a site requiring prescribed burning, herbicide treatment, and seeding of native grasses and forbs may reach $500 -700 per acre. The CTUIR believes that $75,000 per year could be spent on restoration activities on 100 acres as well as $55,000 on cultural resource surveys that will be required prior to ground disturbing activities. Base funding generally fulfills the staff funding while non-reoccurring project funding is competitive and may not always be available.

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Acronyms and Abbreviations

A

ACOE	Army Corps of Engineers
ARPA	Archaeological Resources Protection Act of 1979
ATV	All-Terrain Vehicle
AUM	Animal Unit Month

B

BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BMPs	Best Management Practices
BPA	Bonneville Power Administration
BpS	Biophysical Settings

C

CAA	Clean Air Act of 1970
CFR	Code of Federal Regulations
CFS	Cubic Feet per Second
CRPP	Cultural Resources Protection Program of the Confederated Tribes of the Umatilla Indian Reservation
CTUIR	Confederated Tribes of the Umatilla Indian Reservation
CWA	Clean Water Act of 1970

D

DNR	Department of Natural Resources of the Confederated Tribes of the Umatilla Indian Reservation
DPS	Distinct Population Segment

E

EA	Environmental Assessment
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act of 1973
ESD	Ecological Site Description
ESU	Evolutionary Significant Unit

F

FONSI	Finding of No Significant Impact

G

GMU	Game Management Unit
GRAIP	Geomorphic Roads Analysis and Inventory Package

H

HUC	Hydrologic Unit Code

I

IDT	Interdisciplinary Team
IRR	Indian Reservation Roads
IWMP	Integrated Weed Management Plan

M

MFI	Mean Fire Interval
MIM	Multiple Indicator Monitoring
MSA	Magnuson-Stevens Fishery Conservation and Management Act of 1976
MSL	Mean Sea Level

N

NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act of 1990
NEPA	National Environmental Policy Act of 1969
NHPA	National Historic Preservation Act of 1966
NMFS	National Marine Fisheries Service (NOAA Fisheries Service)
NOAA	National Oceanic and Atmospheric Administration
NPCC	Northwest Power and Conservation Council
NRCS	National Resources Conservation Service
NTU	Nephelometric Turbidity Units
NWCG	National Wildfire Coordinating Group

O

ODEQ	Oregon Department of Environmental Quality
ODFW	Oregon Department of Fish and Wildlife

P

PVG	Potential Vegetation Group
PVT	Potential Vegetation Type

R

RM	River Mile
RMP	Range Management Plan
RV	Recreational Vehicle

S

SHPO	State Historic Preservation Office
SI	Similarity Index

T

THPO	Tribal Historic Preservation Office
TMDL	Total Maximum Daily Load

U

UIR	Umatilla Indian Reservation
U.S.C.	United States Code
USFWS	U.S. Fish and Wildlife Service

W

WDFW	Washington Department of Fish and Wildlife
WMA	Wildlife Management Area
WQMP	Water Quality Management Plan
WUI	Wildland Urban Interface

CHAPTER 1 - INTRODUCTION

1.1 Purpose and Need

The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) established by the Treaty of June 9, 1855, 12 Statute 945, between the United States and the Cayuse, Umatilla, and Walla Walla Tribes lies along the foothills of the Blue Mountains in northeastern Oregon. The Treaty was subsequently ratified by Congress on March 8, 1859. The Umatilla Indian Reservation (UIR) covers a variety of terrain and land uses including rough, uneven forest and rangelands, gently sloping agricultural fields, and long narrow floodplains supporting riparian vegetation. The Blue Mountains border the UIR to the east and the city of Pendleton lies to the west.

The American Indian Agricultural Resource Management Act of 1993, as amended, Title 25 United States Code (USC) § 3701 et seq., mandates the protection, conservation, utilization, and maintenance of the highest productive potential on Indian agricultural lands through the application of sound conservation practices and techniques. These practices and techniques shall be applied to planning, development, inventorying, classification, and management of rangeland resources. Rangeland resources must be managed consistent with integrated resource management plans to protect and maintain values such as wildlife, fisheries, cultural resources, water, and soil resources. Assistance must be provided to trust and restricted Indian landowners in leasing/permitting their rangelands for a reasonable annual return, consistent with prudent management and conservation practices, and community goals as expressed in the tribal management plans and applicable tribal ordinances. In order to meet the objectives, a 10-year Indian rangeland resource management and monitoring plan must be developed and implemented. At the end of the 10-year period the plan must be reviewed for relevancy, update or rewrite.

Setting

The Blue Mountain Slope and Blue Mountain Uplands contain true grasslands, shrub-grasslands, and forest stringers. The poor condition of plant communities in many parts of the UIR is a result of prolonged heavy grazing and the introduction of exotic annual grasses. This occurred mostly in the period extending from the 1880’s to the 1920’s when large numbers of sheep, cattle, and horses were grazed. There were also stock driveways that continued through the 1930’s that were used by non-Indians to herd livestock across Indian lands to areas adjacent to the UIR. Preferred forage plants have diminished and have been replaced by less preferred plants. Narrative reports indicate that attempts to balance forage supply with livestock numbers has resulted in substantial reductions in livestock numbers since establishment of the UIR.

Sixteen range units comprising allotted, Tribal, and fee patent lands were established in the late 1950’s based on land ownership and historical use patterns in an attempt to improve management of rangelands and grazeable woodlands on the UIR. The intermingled pattern of land ownership precluded management of lands held in trust by the United States separate from fee lands often held by non-Indians. Since the 1950’s four of the sixteen range units were combined with other existing range units due to changes in land ownership, a reduction in the number of livestock operators seeking grazing privileges, and a change in land management goals and objectives.

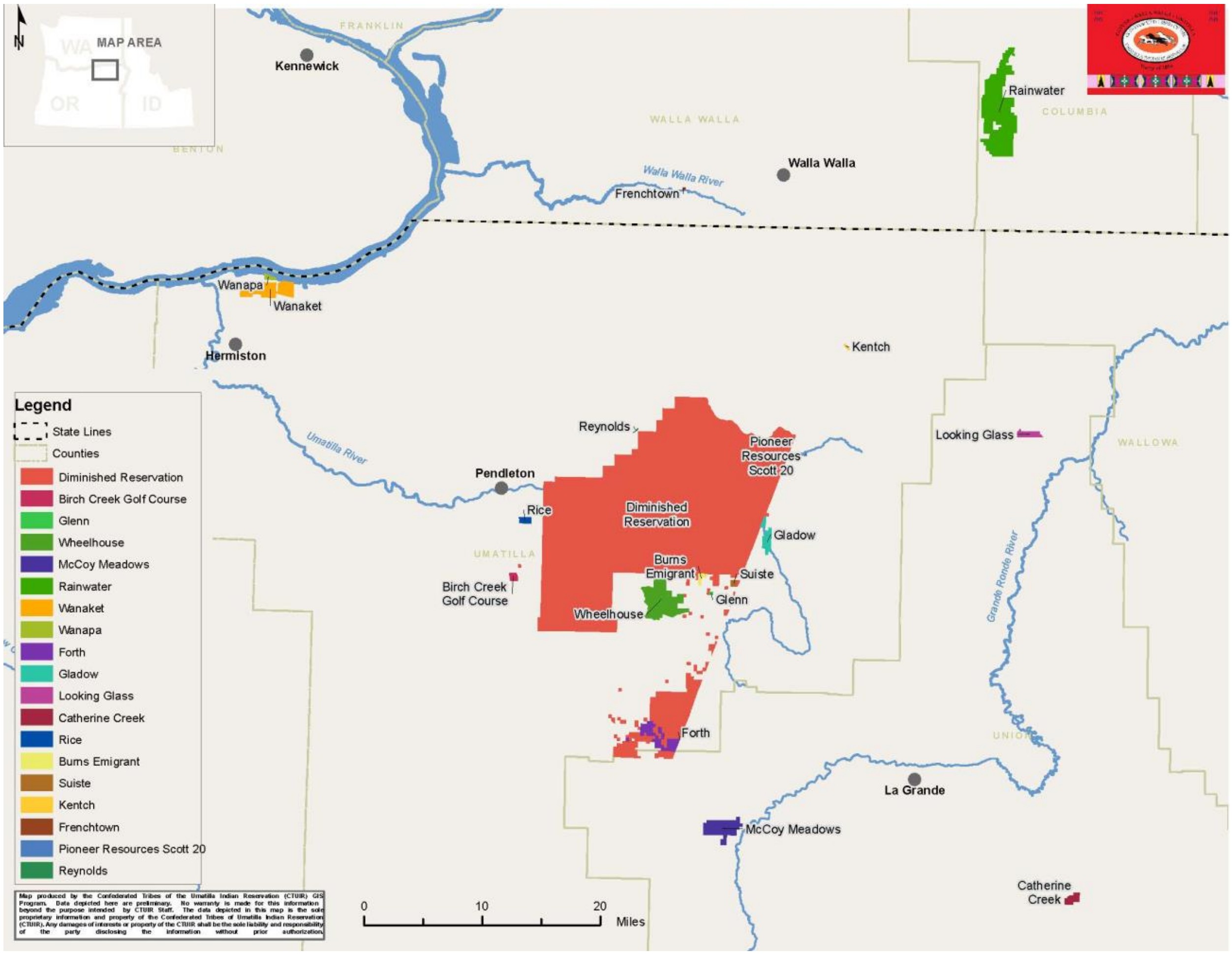

Figure 1-1. Umatilla Indian Reservation.

1.2 Relationship to Other Federal Statutes

1.2.1 National Environmental Policy Act of 1969; Title 42 United States Code (U.S.C.) § 4321-4370d

The National Environmental Policy Act of 1969, (NEPA) as amended, requires that federal agencies consider the potential effects of actions that might adversely affect the environment and consider possible alternative courses of actions to reduce impacts before approving the actions. Section 102 of NEPA establishes procedural requirements for federal agencies to prepare a detailed statement on: (1) the environmental impact of the proposed action; (2) any adverse effects that cannot be avoided; (3) alternatives to the proposed action; (4) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity; and (5) any irreversible and irretrievable commitments of resources that would be involved in the proposed action.

The BIA and CTUIR prepared an Environmental Assessment (EA) to determine if the approval and implementation of the Range Management Plan (RMP) would likely result in significant impacts to the biological, physical and social environments. The BIA concluded that approval and implementation of the RMP would not result in significant adverse impacts to the environment and issued a Finding of No Significant Impact (FONSI) in November 2022.

1.2.2 National Historic Preservation Act of 1966; Title 16 U.S.C. § 470 et seq. and Title 54 U.S.C. § 300101 et seq.

Section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended, and its implementing regulations found at Title 36 CFR Part 800, require federal agencies to consider impacts that an undertaking will have on historic properties. The significance of the resources must be evaluated using established criteria outlined at Title 36 CFR Part 60.4. If a resource is determined to be a historic property, Section 106 of the NHPA requires that effects of the undertaking on the resource be determined. A historic property is: "…any prehistoric or historic district, site, building, structure or object included on, or eligible for inclusion on the National Register of Historic Places, including artifacts, records, and material remains related to the district, site, building, structure, or object…" (54 USC §300308). Potentially adverse effects on the historic properties must be avoided, minimized or mitigated.

In 1996, the Department of the Interior, National Park Service and the CTUIR entered into an agreement for the CTUIR to assume State Historic Preservation Office (SHPO) responsibilities for all lands within the exterior boundaries of the UIR and on all CTUIR tribal lands outside the boundaries of the UIR under 54 USC §302702. All federal undertakings are reviewed by the Tribal Historic Preservation Office (THPO).

1.2.3 Archaeological Resources Protection Act of 1979; Title 16 U.S.C. § 470aa et seq.

The Archeological Resources Protection Act of 1979 (ARPA), as amended protects archeological resources on public and Indian lands by establishing criminal and civil penalties for unlawful excavation, removal, or destruction of such resources and sets up permitting policies through the appropriate land manager.

1.2.4 Native American Graves Protection and Repatriation Act of 1990; Title 25 U.S.C. § 3001 et seq.

The Native American Graves Protection and Repatriation Act of 1990 (NAGPRA), as amended, protects Native American burials during the planning and implementation of projects on all lands within the external boundaries of the UIR and on CTUIR off reservation trust lands. In the event of a known burial, the project must address treatment of the burial in consultation with the CTUIR. In the event of an inadvertent discovery of Native American human remains or funerary objects, all work in the immediate vicinity of the burial must cease in order to develop a Plan of Action under NAGPRA to address treatment of the remains in conformance with NAGPRA regulations, Title 43 CFR Part 10.1.

1.2.5 Endangered Species Act of 1973; Title 16 U.S.C. § 1531 et seq.

The Endangered Species Act (ESA) of 1973, as amended, provides a means for the protection of all endangered and threatened plant and animal species. It is comprehensive in that it also provides for the protection of critical habitats on which these species depend for survival. Section 7 of ESA and its implementing regulations found at Title 50 Code of Federal Regulations Part 402, requires federal agencies, in consultation with the U.S. Fish and Wildlife Service (USFWS) and/or the National Marine Fisheries Service (NMFS), to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species.

1.2.6 Magnuson-Stevens Fishery Conservation and Management Act of 1976; Title 16 U.S.C. § 1801 et seq.

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) of 1976, as amended by the Sustainable Fisheries Act of 1996, establishes procedures intended to identify, conserve, and enhance Essential Fish Habitat (EFH) for those species regulated under a federal fisheries management plan. The MSA requires federal agencies to consult with the NMFS regarding actions or proposed actions that may adversely affect EFH (Section 305(b) (2)). EFH is defined under the MSA as those waters and substrate necessary to fish for “spawning, breeding, and feeding, for growth to maturity.”

1.2.7 Bald and Golden Eagle Protection Act; Title 16 U.S.C. § 668 et seq.

The Bald and Golden Eagle Protection Act of 1940, as amended, prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald or golden eagles, including their parts, nests, or eggs. The Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." Disturb means: “to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior." In addition to immediate impacts, this definition also covers impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, and causes injury, death or nest abandonment.

1.2.8 Migratory Bird Treaty Act of 1918; Title 16 U.S.C. § 703 et seq.

The Migratory Bird Treaty Act of 1918, as amended, first enacted to implement the convention for the protection of migratory birds between the United States and Canada makes it unlawful without a waiver to pursue, hunt, take, capture, kill, or sell nearly 1,100 species of birds listed as migratory birds. The statute does not discriminate between live or dead birds and grants full protection to any bird parts including feathers, eggs, and nests.

The Act was enacted in an era when many bird species were threatened by the commercial trade in birds and bird feathers. Since 1918, similar conventions between the United States and four other nations have been made and incorporated into the Migratory Bird Treaty Act: Mexico (1936), Japan (1972) and the Soviet Union, now its successor state Russia (1976). Some of the conventions stipulate protections not only for the birds themselves, but also for detrimental alterations to habitats necessary for the birds' survival.

1.2.9 Pacific Northwest Electric Power Planning and Conservation Act; Title 16 U.S.C. § 839-839h et seq.

The Pacific Northwest Electric Power Planning and Conservation Act of 1980 addresses the impact on fish and wildlife of hydroelectric dams on the Columbia River. The Act established the Pacific Northwest Electric Power and Conservation Council (NPCC) and directs the Council to adopt a regional energy conservation and electric power plan and a program to protect, mitigate, and enhance fish and wildlife on the Columbia River and its tributaries. Among other things, the Act is intended to protect, mitigate, and enhance the fish and wildlife, including related spawning grounds and habitat, of the Columbia River and its tributaries, particularly anadromous fish. The Act directs the Administrator of the Bonneville Power Administration (BPA) to fund and use applicable laws to protect, mitigate, and enhance fish and wildlife in the Columbia River and its tributaries in a manner consistent with the Act, the plan, and the fish and wildlife program.

1.2.10 Clean Air Act of 1970; Title 42 U.S.C. § 7401 et seq.

The Clean Air Act (CAA) of 1970, as amended, was originally enacted to protect the quality of the nation’s air resources and the public health and welfare. The second purpose of the CAA is to initiate a research and development program to achieve the prevention and control of air pollution. The final goal of the CAA is to encourage the development of regional air pollution prevention and control programs.

The law authorizes the U.S. Environmental Protection Agency (EPA) to establish National Ambient Air Quality Standards (NAAQS) to protect health and public welfare and to regulate emissions of hazardous air pollutants. Federal agencies must comply with all federal, state and tribal air quality standards and requirements for smoke management.

1.2.11 Clean Water Act of 1972; Title 33 U.S.C. § 1251 et seq.

The Clean Water Act (CWA) of 1972, as amended, established the basic structure for regulating discharges of pollutants into the waters of the United States and establishing quality standards for surface waters. In accordance with provisions of this statute, the CTUIR and the EPA have developed a Total Maximum Daily Load (TMDL) and a Water Quality Management Plan (WQMP) for the UIR.

1.3 Relationship to CTUIR Department of Natural Resources First Foods Mission

From the CTUIR perspective, natural resources upon which Tribal members depend are cultural resources whether they are within the UIR or at usual and accustomed fishing, hunting, and gathering areas. Traditional foods of the CTUIR are served at ritual meals and are known to the CTUIR as “*First Foods*”. Listed in the order in which they are served, they are water, salmon, big game, roots, and berries. The *First Foods* serving order includes “men’s foods” - water, salmon, and big game, and “women’s foods,” roots and berries (Endress et al. 2019) (Figure 1-2). These gender categories reflect the harvest, preparation, and serving roles associated with *First Foods*. The CTUIR has identified the need for attention to ecological processes that sustain and produce *First Foods* to be responsible and responsive to the CTUIR community.

The value of the *First Foods* to the CTUIR community is evidenced by the longevity and constancy of the foods and serving ritual across many generations and recognition through *First Food*-related ceremonies. While the means to pursue, acquire, process, and prepare *First Foods* have changed dramatically with the advent of settlement by non-indigenous peoples, the order has not. Tribal members have adapted a variety of means to acquire *First Foods* over time, yet *First Foods* and their serving order remain constant. Despite the availability of new, introduced foods, *First Foods* have not been replaced in the serving ritual. New foods are served at Tribal meals, but they are not recognized in the serving ritual; they are served after *First Foods*, and with no formal order or sequence that relates to CTUIR cultural beliefs. *First Foods* ceremonies are still recognized by people who harvest their first salmon, kill their first deer, dig their first roots, and pick their first berries. Further evidence of the order’s durability is clear at celebrations (“pow-wows”) where some traditional dance categories may require individuals to have had their “First Kill Ceremony” for deer as a requisite to participation in the dance.

The *First Foods* are central to the CTUIR Department of Natural Resources (DNR) mission statement:

> “To protect, restore, and enhance the First Foods - water, salmon, deer, cous, and huckleberry - for the perpetual cultural, economic, and sovereign benefit of the CTUIR. We will accomplish this utilizing traditional ecological and cultural knowledge and science to inform: 1) population and habitat management goals and actions; and 2) natural resource policies and regulatory mechanisms.”

The CTUIR considers *First Foods* to constitute the *minimum* ecological products necessary to sustain CTUIR culture. Management efforts need to incorporate ecological processes (for example fire regimes in upland range and forest lands and high flows in floodplains) that relate to the sustained production of *First Foods.* The CTUIR *First Foods* Upland Vision (Endress et al. 2019) provided a general framework incorporating four primary ecological components associated with healthy upland ecosystems that provide a full array of ecosystem services including the continued production of *First Foods*. These components are: (1) Soil Stability, (2) Hydrologic Function, (3) Landscape Pattern, and (4) Biotic Integrity.

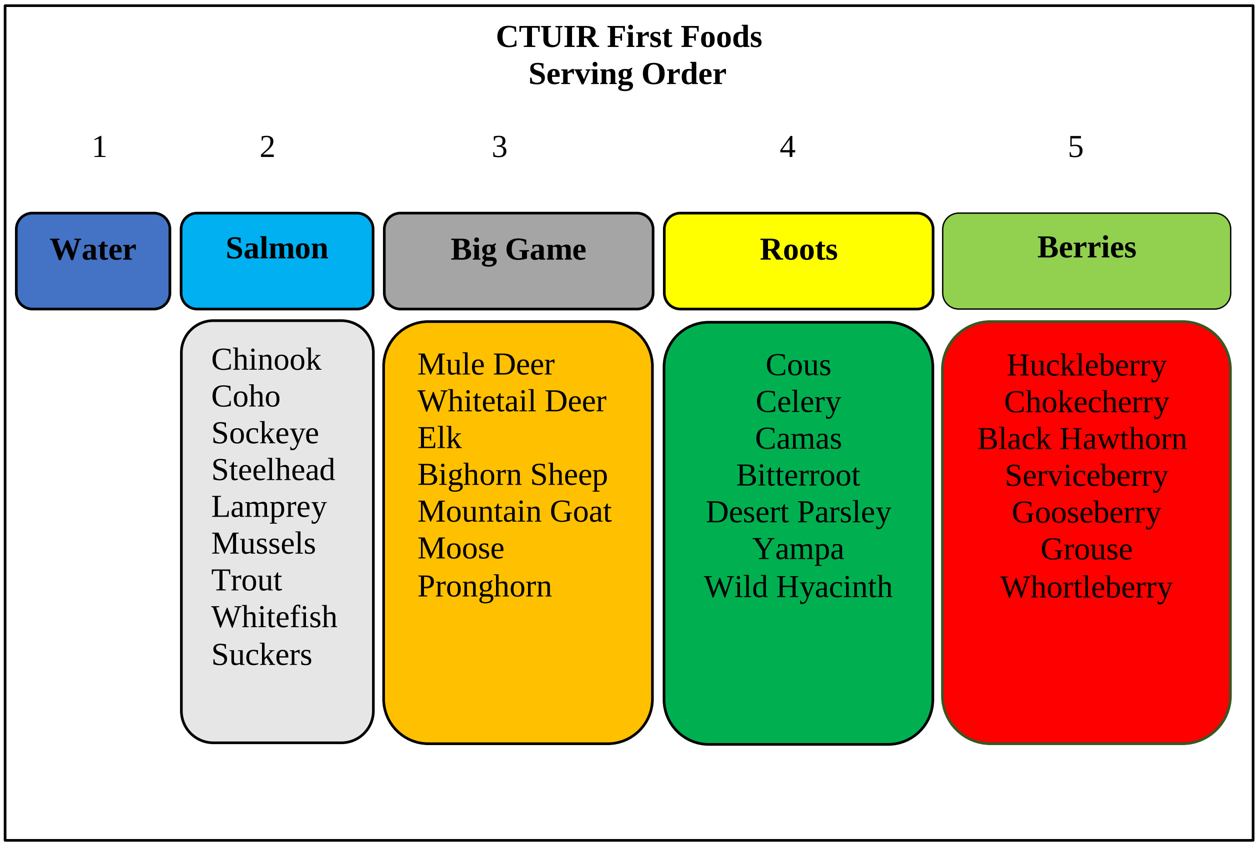

Figure 1-2. First Foods Serving Order.

1.4 Relationship to Other CTUIR Plans and Codes

1.4.1 Comprehensive Plan

In 2018, the CTUIR, through Board of Trustees Resolution Number 18-090, adopted an updated Comprehensive Plan that set forth the long-range goals of its members as they relate to treaty reserved rights, both on and off the UIR, and the current and future needs of the people. The plan specified the following goals: (1) protect and enhance First Foods (water, salmon, deer and elk, culturally significant roots and berries) for perpetual economic and sovereign benefits; (2) manage lands to assure the highest and best use consistent with their inherent capabilities, sound management principles, and cultural values; (3) diversify the economy by creating suitable conditions for tribal members to start and expand business enterprises; and (4) plan for long-term economic security in face of national and global environmental and economic conditions.

1.4.2 Water Code, Total Maximum Daily Load, and Water Quality Management Plan

In 2003, The CTUIR Board of Trustees adopted Resolution Number 03-100, enacting a Comprehensive Water Code integrating Water Quality Implementing Provisions and Stream Zone Alteration Regulations in its text. The new Water Code established an anti-degradation policy to provide for the maintenance and protection of waters of the Umatilla Indian Reservation. The Water Code further provided that any person who performs any activity that alters streamflow, water quality, ground contours, or perennial vegetation in several named stream zones on the UIR first had to obtain a valid Stream Zone Alteration Permit.

In 2004, The CTUIR Board of Trustees adopted Resolution Number 04-73, enacted a TMDL "to restore water quality and cultural integrity" of the waters of the UIR. A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can accept and still meet water quality standards for public health and healthy ecosystems. The TMDL set water quality restoration targets for two pollutants: temperature and turbidity. The TMDL seeks to reduce late summer stream temperatures and the amount of stream fine sediments as much as possible.

The Water Commission of the CTUIR adopted a WQMP in 2008 that identifies best management practices (BMP's) necessary to achieve the water quality objectives. These best management practices include but are not limited to establishment of streamside (riparian) management zones and road management.

1.4.2 Historic Preservation Code

In 2016, the CTUIR Board of Trustees adopted Resolution Number 16-03 enacting a Historic Preservation Code to preserve, protect, and perpetuate the cultural resources of the CTUIR. The Historic Preservation Code does not define or regulate the culture or traditional practices of the members of the CTUIR.

Prior to the commencement of any federal undertaking, the Cultural Resources Protection Program (CRPP), in DNR and THPO must be consulted to determine the area of potential effect of proposed undertaking and potential effects to historic properties. All known or discovered cultural and archeological resources must be addressed in the Section 106 of NHPA and Historic Preservation Code processes. If previously unknown cultural resources are discovered during project activities, these activities must be suspended until the impacts to historic properties can be addressed.

1.4.4 Land Development Code

The CTUIR Board of Trustees in 1983 enacted the Land Development Code through Resolution Number 83-74. Since 1983, the Board of Trustees has amended the Land Development Code multiple times. Range Units on the UIR are located within the G-1 Big Game Grazing Forest and the F-2 Restricted Indian Forest Land Use Zones. Under the Land Development Code, the Land Protection Planning Commission has the responsibility to provide recommendations to the Board of Trustees for the (1) award of grazing privileges to tribal members on tribal lands without competitive bidding, (2) allocation of forage between livestock, horses, and big game; and (3) recommendations for range improvement, grazing systems, and best management practices.

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CHAPTER 2 – THE MANAGEMENT SITUATION

2.1 Background Information

The CTUIR have a responsibility to provide for the needs of its members through the development of a strong diversified economy. Prior to 1995, the CTUIR relied on federal grants and contracts, transfer payments, and agricultural income including proceeds from livestock grazing to support the governmental sector of the UIR economy. These sources of income have historically been subject to unpredictable changes due to political and economic changes at the state, national, and international level.

The CTUIR have developed in the years since 1995 the Wildhorse Resort and Casino, which now includes a casino, hotel and restaurant, golf course, recreational vehicle (RV) park, Tamastslikt Cultural Institute, bowling alley, and cinema complex. Currently, the service and governmental sectors are the main economic foundation of the UIR.

The CTUIR continue to depend on natural resources for development of a strong, diversified economy while preserving cultural, subsistence, and aesthetic values. Fishing and hunting, as well as the gathering of roots and berries, are deeply rooted within the Tribal social structure. For CTUIR to exercise Tribal Treaty rights and express cultural values, the watersheds and floodplains must be ecologically healthy and capable of sustaining robust communities of *First Foods* in part supported by a healthy structure, pattern, and function of vegetation. The harvesting, processing, manufacturing, and marketing of farm, forest, livestock, and mineral products provide income to landowners and the CTUIR.

2.2 Primary Issues for Management of Rangelands and Grazable Woodlands

A preliminary list of issues and concerns were identified during a meeting of an Interdisciplinary Team (IDT) comprised of staff from the Department of Natural Resources, the Department of Economic and Community Development, and the Office of Information Technology of the CTUIR, as well as from the BIA Wildland Fire Program on March 18, 2021. These issues and concerns were further refined during subsequent meetings with the Cultural Resources Committee on April 6, 2021, the Economic and Community Development Committee on April 6, 2021, the Land Acquisition Committee on April 6, 2021, the Fish and Wildlife Commission on April 13, 2021, the Water Commission on April 20, 2021, and the Land Protection Planning Commission on April 27, 2021. In addition, the IDT published an article in the Confederated Umatilla Journal in April 2021, inviting participation from individuals interested in or potentially affected by the development of the RMP. Finally, the CTUIR mailed out a request for comments concerning rangeland resources to all tribal members in February of 2022.

The following issues and concerns identified by the process described above are important to development/approval of the RMP.

2.2.1 First Foods

How does the CTUIR ensure healthy, resilient, and dynamic ecosystems capable of providing "*First Foods*" that sustain the continuity of the Tribe's culture?

2.2.2 Water Quality/Instream and Riparian Ecosystems

How does the CTUIR protect and/or improve water quality and instream and riparian habitat?

2.2.3 Threatened, Endangered, and Candidate Fish and Wildlife Species

How will critical habitat for fish and wildlife species listed as threatened or endangered under ESA be protected?

2.2.4 Wildlife/Wildlife Habitat

How much and what quality of wildlife habitat should be provided?

2.2.5 Upland Plant Community Composition/Invasive Plants

What is the desired future composition and structure of upland vegetation?

2.2.6 Climate Change

How will climate change affect upland vegetation?

2.2.7 Historic Properties/Traditional Uses

How will the need to protect historic properties and to provide the opportunity for traditional uses be met?

2.2.8 Livestock Grazing as a Vegetation Management Tool (Targeted Grazing)

Can livestock grazing be used as a management tool to achieve vegetation management objectives?

2.2.9 Livestock Grazing as an Economic Development Opportunity and as Means to Generate Income for Landowners

Can livestock grazing provide an opportunity for the CTUIR and/or its members to start successful livestock enterprises as well as generate income for the CTUIR and individuals as landowners?

2.2.10 Transportation System

How should the Transportation System be managed?

2.2.11 Fire Management

How will fuel loads and/or fire as a natural disturbance process be managed?

2.2.12 Monitoring and Evaluation

Are current assessments of the attributes, or touchstones, (soil stability, hydrologic, function, landscape pattern, and biotic integrity) vital to upland ecosystem health available and what monitoring protocols are required to detect changes in these attributes over time?

2.2.13 Implementation Costs and Needs

What will be the cost of implementing and monitoring effectiveness of the RMP?

2.3 Setting

2.3.1 Land Ownership

The Cayuse, Umatilla, and Walla Walla Tribes believe they have reserved approximately 800 square miles or 512,000 acres as a homeland in the Treaty of June 9, 1855. The Cayuse, Umatilla, and Walla Walla Tribes ceded 6.4 million acres to the United States reserving the right to fish at all usual and accustomed sites and the right to hunt and gather traditional foods on open and unclaimed lands off the UIR (Figure 2-1). In 1872, the Commissioner of Indian Affairs stated the size of the UIR was 512,000 acres in line with what the Tribes believed they had reserved (Conroyer, 1872). However, in 1876, the Commissioner of Indian Affairs listed the size of the UIR as 326,550 acres in his annual report (Conroyer, 1876). In 1890, the Commissioner of Indian Affairs believed the size of the UIR to be 270,000 acres (Luckey, 1890). As surveyed in 1871, the UIR actually encompassed 384 square miles or 245,699 acres. The difference in size of the UIR between what the Tribes believed was intended and as actually surveyed may be attributed to the true location of "Lee's Encampment". Whether its location was at Meacham where a Major Lee of the Oregon Militia once camped or a place by Five Points Creek in the Grande Ronde drainage where Jason Lee, the Missionary, once wintered has never been resolved (CTUIR 2010). The 1871 survey used Meacham as the location of “Lee’s Encampment”.

The UIR was further reduced to 236 square miles (157,982 acres) by the Slater Act of 1885, 23 Statute 340. The present boundary is termed the “diminished reservation”. In addition to the lands within the diminished reservation, the CTUIR owns 14,140 acres held in trust by the United States outside the diminished reservation but within the 1871 surveyed reservation boundary. This land was acquired through a special act of Congress in 1939, 53 Statute 1351, that restored unclaimed land to Tribal control. Pursuant to the Secretary of Interior Order of Restoration dated March 20, 1940, these lands were “added to and made a part of the Umatilla Indian Reservation” and are referred to as the Johnson Creek Restoration Area.

Today, the land ownership pattern on the UIR is a checkerboard of parcels falling into three main classes: (1) deeded land held in fee simple estate by non-Indians, Indians, and the CTUIR; (2) Tribal trust land with legal title held by the United States and the beneficial or equitable title held by the CTUIR; and (3) allotted trust land with legal title held by the United States and the beneficial or equitable title held by an individual Indian allottee or his or her heirs. The combination of deeded land interspersed with trust land has produced a checkerboard pattern of land ownership on the UIR.

The CTUIR has adopted a policy of purchasing non-Indian lands and individual interests in allotted lands as property becomes available and funds permit. The CTUIR has purchased approximately 6,194 acres (Forth and Wheelhouse properties) from non-Indians in the area between the diminished reservation and original reservation boundaries. These purchased properties are not held in trust by the United States at present. The CTUIR also acquired the Rainwater Wildlife Management Area (WMA) totaling 10,831 acres in southeast Washington and the Wanaket WMA totaling 2,865 acres along the Columbia River in northeast Oregon through purchases with BPA fish and wildlife mitigation funds. The Wanaket WMA has been converted from fee to tribal trust status. In addition, the CTUIR has acquired the Gladdow and Kentch properties in Umatilla Basin and the Nielsen, Southern Cross, and McCoy Meadows Ranch properties in the Grande Ronde Basin totaling 4,746 acres. In total, CTUIR managed lands encompass 90,324 acres of steppe vegetation and grazable woodlands

The RMP is intended to apply to all allotted and tribal trust lands and tribal fee lands regardless of whether or not the lands are within the original reservation boundary. The RMP will also influence use of non-tribal fee lands that are fenced with allotted and tribal trust lands as well as any tribal fee lands to form management units. Use of these non-tribal fee lands cannot conflict with management of allotted and tribal trust lands as well as tribal fee lands. For example, livestock grazing on non-tribal fee lands may not occur unless the lands are fenced outside of CTUIR grazing units. Any non-Indian fee lands included in CTUIR range units must adhere to CTUIR grazing permit stipulations for the unit the fee lands are associated with. Table 2-1 summarizes current land ownership class by acreage. It should be noted that CTUIR continues to acquire new lands and that acreages in the various ownership categories are likely to change over the planning horizon.

Table 2-1. Land Ownership Within the Range Management Plan Area.		
Land Ownership Class	Steppe Vegetation Acres	Grazable Woodland Acres
Within the Diminished Reservation Boundary		
Allotted Trust	26,229	5,522
Tribal Trust	5,959	2,051
Tribal Fee	9,292	3,242
Non-Tribal Fee	5,137	1,446
Subtotal	46,617	12,261
Between Diminished and Original Reservation Boundaries		
Allotted Trust		
Tribal Trust	3.804	9,147
Tribal Fee	3,259	2,974
Non-Tribal Fee	200	707
Subtotal	7,263	12,828
Outside the Original Reservation Boundary		
Allotted Trust		
Tribal Trust	3,084	
Tribal Fee	6,385	9,376
Non-Tribal Fee		
Subtotal	9,469	9,376
Grand Total	63,349	34,465

2.3.2 Climate

The entire UIR falls within Oregon's North Central Climatic Zone (Zone 6) (Johnson and Clausnitzer 1992). Weather is predominately influenced by Pacific Ocean air masses. The major influences on the regional climate are the Cascade Mountains which form a barrier against warm moist fronts from the Pacific Ocean (Johnson and Clausnitzer 1992). The Columbia Gorge provides a break in the curtain of the Cascade Mountains and occasionally allows moisture laden marine air to penetrate into the northern Blue Mountains. This climate is called temperate oceanic and differs significantly from temperate continental. During the winter, the temperate oceanic climate has greater cloudiness, increased precipitation, and higher relative humidity with less fluctuation in temperatures.

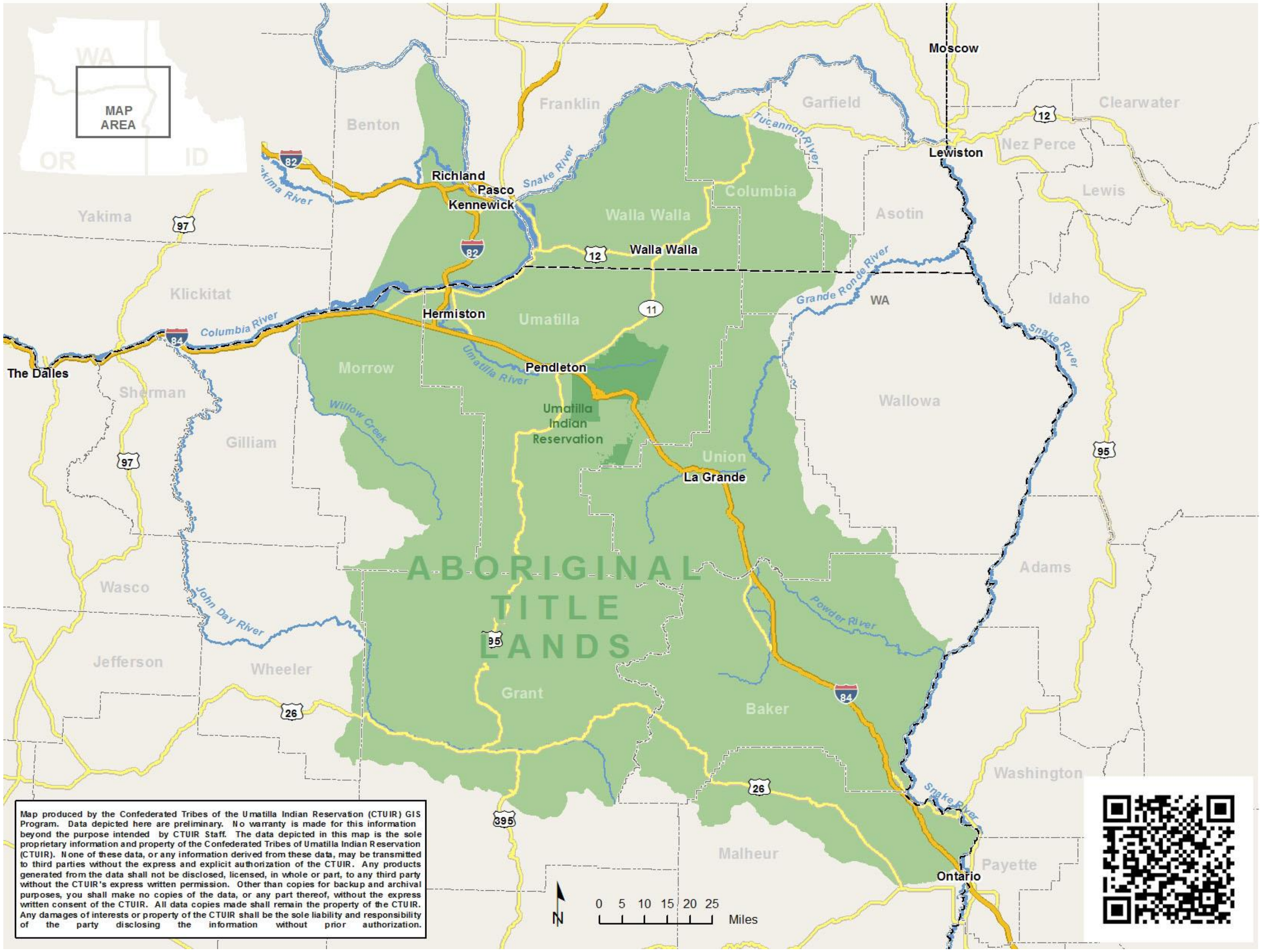

Figure 2-1. Aboriginal Title Lands

The UIR experiences strong seasonal fluctuations in both temperature and precipitation. During summer, the UIR experiences a continental climate with warm days, cool nights, and little precipitation. Winters exhibit short periods of extreme cold intermixed with milder temperatures. Heavy fog with visibility less than 1,200 feet is very common during the winter months along the valley bottoms when high pressure conditions are present. Precipitation also changes dramatically with the seasons, with most precipitation occurring during the fall, winter, and spring. The climate of the UIR is also strongly influenced by elevation. Precipitation falls mainly as rain at lower elevations. Average annual precipitation is markedly higher at higher elevations in the Blue Mountains with much of this occurring as snow (Johnson and Clausnitzer 1992).

Weather records obtained from the National Oceanic and Atmospheric Administration (NOAA) stations at Pendleton and Meacham, Oregon reflect the elevation change between the western and eastern portions of the UIR. The Pendleton station is located at 1,482 feet above mean sea level (msl) and the Meacham station is located at 4,050 feet above msl. Mean annual temperatures for Pendleton and Meacham are 52.1° Fahrenheit (F) and 43.7° F, respectively (30-year period of record 1990-2020). Mean precipitation levels are 12.7 inches and 29.7 inches at the Pendleton and Meacham stations respectively.

2.3.3 Topography

The landforms of the UIR can be divided into four groups: the *Pendleton Plains*, the *Blue Mountain Slope*, the *Blue Mountain Uplands*, and the *Stream Bottomlands*. The Pendleton Plains are a slightly dissected plateau characterized by gently rolling slopes favorable to crop production and are found between 1,200 to 2,000 feet above mean sea level (msl). The Blue Mountain Slope, located between 2,000 and 3,000 feet above msl, is a series of steep walled canyons ascending to the more plateau like Blue Mountain Uplands. The Blue Mountain Uplands are an area of meadows and forested land. Approximately one-third of the UIR is within this subdivision with elevations ranging from 3,000 feet above msl to approximately 4,100 feet above msl. The Stream Bottomlands are found along the Umatilla River, McKay Creek, and Patawa Creek which dissect other landforms and are characterized by moderately flat floodplains edged by moderate to steep slopes (Gonthier and Harris 1977).

2.3.4 Hydrology

Umatilla River

Originating at nearly 6,000 feet in elevation, the Umatilla River headwaters flow out of the Blue Mountains through narrow, well-defined canyons. After leaving the mountains, the North and South Fork join to form the mainstem, a 90-mile reach of river which flows through a series of broad valleys that drain low rolling lands (Army Corps of Engineers (ACOE) 1999); (Oregon Department of Environmental Quality (ODEQ) 2001). The mainstem Umatilla River has eight main tributaries: the North and South Forks of the Umatilla River and Meacham Creek in the upper basin; Wildhorse, Tutuilla, McKay and Birch Creeks in the mid basin; and Butter Creek in the lower basin (Table 2-2).

Table 2-2. Mainstem Length and Drainage Area of Major Tributaries of the Umatilla River.			
Drainage	Length	Area (sq. miles)	Distance from Mouth of the Umatilla River (miles)
North Fork Umatilla River	9	34	86
South Fork Umatilla River	10	57	86
Meacham Creek	31	165	79
Wildhorse Creek	34	190	55
Tutuilla Creek	10	61	52
McKay Creek	32	191	51
Birch Creek	31	291	47
Butter Creek	57	465	14

Most primary tributaries of the Umatilla River enter from the south. Wildhorse Creek drains the divide between the Umatilla River and the Walla Walla River to the north. The North and South Forks of the Umatilla River and Meacham Creek account for approximately 14% of the Umatilla River Subbasin drainage area yet supply 40-50% of the average flow to the Umatilla River (U.S. Forest Service (USFS) 2001). Average annual discharges are 223 cubic feet per second (cfs) for the Umatilla and 193 cfs for Meacham Creek. Water runoff peaks in April, while the lowest flows generally occur in September (USFS 2001). The average monthly discharge of the Umatilla River (measured at river mile (RM) 2.1) varies from 23 cfs in July to 1,095 cfs in April (low flow at the mouth occurs in July rather than September due to upstream withdrawals for irrigation, a difference that reflects seasonal variation in precipitation).

In 2021, the CTUIR used the *ArcSWAT* model with the most recent climate data sets (precipitation, air temperature, wind speed, humidity, and shortwave radiation) to estimate future stream flows in the Umatilla River. The CTUIR expects average annual precipitation (rain and snow) to increase across the range of the Blue Mountains. However, they expect the amount that is delivered as snow in the Blue Mountains to significantly decline between the historic range of the past 30 years and the end of the century. Winter flows are predicted to increase significantly. They expect summer low flows to be variable, but anticipate most years will have reduced summer flows (https://storymaps.arcgis.com/stories/052caa578e9e4167873c649caf322ed5).

There are numerous smaller streams that flow into the Umatilla River. These streams include Isqúulktpe, Buckaroo, Coonskin, Moonshine, Cottonwood, and Mission Creeks. Big and Little Johnson Creeks drain Tribal lands in a portion of the Johnson Creek Restoration Area. Most of these creeks only carry water for their entire length during periods of snowmelt or sustained rainfall.

Most flooding events in the Umatilla basin result from rain-on-snow events. This usually occurs when snow accumulates between 1,500-3,500 feet elevation in the Blue Mountains and then is rapidly melted by rain and warm winds and usually occurs from December through February (NPCC 2004a). Sixty-two percent of the Umatilla Subbasin falls within the 1,500 to 3,500 feet above msl range in what is termed the transient snow zone, an area that substantially contributes to the flood regime in the Subbasin.

Wanaket Wildlife Management Area

The 2,817-acre Wanaket WMA is located in northeastern Oregon and lies adjacent to the south shore of the Columbia River along Lake Wallula between the Port of Umatilla (River Mile 295) on the west and Hat Rock State Park (River Mile 299) on the east. It is bisected from west to east by State Highway 730. Wanaket is located on an outwash plain along the Columbia River. The micro topography is one of undulating knobs and swales. Slopes are typically flat, with slight undulations, basalt rock outcroppings, scattered intermittent and permanent wetlands, and small closed basins (potholes). Cliffs, ranging from several to approximately 30 feet in height and exist on the north side of the project area above the Columbia River and on the east and west walls of Box Canyon. Elevations in the project area range from approximately 400 – 500 feet above msl (CTUIR 2001).

Weather records obtained from NOAA for the Hermiston area show the mean annual temperature is 52.0° F and the mean annual precipitation level is 8.75 inches (20-year period of record 2000-2020).

The Wanaket WMA provides both shrub/steppe and emergent wetland habitats. There are approximately 2,493 acres of shrub/steppe and grasslands. The Wanaket WMA contains approximately 160 acres of emergent wetland habitats. There are 64 ponds providing emergent wetland habitat and 6 ponds providing approximately 14 acres of open water habitat. Ponds ranges in size from .25 to 10.5 acres with an average pond size of 2.2 acres and an average pond perimeter of 1,560 feet. Total amount of shoreline provided by the ponds is approximately 18.3 miles (CTUIR 2001).

McCoy Meadows Ranch

The McCoy Meadows Ranch is located on approximate 2,600 acres in the lower reaches of the Meadow, McCoy, and McIntyre Creeks of the Upper Grande Ronde River Subbasin. The ranch encompasses about 2 miles of McCoy Creek, 1 mile of McIntyre Creek, and 4 miles of Meadow Creek. McIntyre Creek is a tributary to McCoy Creek which is a tributary to Meadow Creek. The entire Meadow Creek watershed encompasses 181.2 square miles of which McCoy Creek watershed comprises approximately 56.9 square miles. Meadow Creek enters the Grande Ronde River at RM 183.2. McCoy Creek drains the extreme southern portion of the Johnson Creek Restoration Area. Jennings Creek flows into Indian Lake, a reservoir constructed in 1969. Ensign Creek is the outlet to Indian Lake and flows into McCoy Creek (NPCC 2004b).

The Grande Ronde and its tributaries are snowmelt runoff streams. Peak runoff occurs in spring, generally from April through June, from melting snowpack and spring rains. Runoff recedes to low flows by late summer, usually August and September. Flow again increases in late fall in response to autumn rains. Annual precipitation averages 20 inches, of which two-thirds comes as fall rains and winter snows from September through March. Rains in April, May, and June account for most of the remaining precipitation. Snowmelt is generally complete by May 1. The growing season is about 120 days, but frost may occur in any month. The average high and low temperatures for January are 38 and 24 °F, respectively; the average high and low temperatures for July are 87 and 53 °F, respectively.

Rainwater Wildlife Management Area- South Fork Touchet River

The Rainwater WMA is located in southeastern Washington about 8 miles south of Dayton, Washington in Columbia County. The Rainwater WMA includes approximately 8,678 acres of mid elevation range, forestland, and riparian habitat along the South Fork Touchet River adjacent to and north of the Umatilla National Forest. The Rainwater WMA is located in the North Blue Mountain Physiographic Province within the Walla Walla River Subbasin. The area includes relatively flat forested ridgetops and steep canyon lands bisected with a mosaic of grass/shrub communities on southern exposures and forest communities on northern exposures. The South Fork Touchet River supports a wide, gentle riparian vegetation dominated floodplain. Elevation ranges from 2,240 to 4,860 feet above msl.

The South Fork of the Touchet River is approximately 20 miles in length and encompasses 43.64 square miles. Major tributaries to the South Fork Touchet River include the Burnt Fork, Green Fork, and Griffin Fork. The South Fork of the Touchet River forms the west boundary of the Rainwater WMA for approximately 10 miles as it flows northward. The CTUIR have mapped 127 miles of streams within the Rainwater WMA. Streams range in size from small ephemeral draws to larger, fish bearing streams. The CTUIR used Washington Department of Natural Resources' definitions of stream types for this effort. The CTUIR mapped stream types based on field observations and digital delineation on U.S. Geological Survey quadrangle and orthophotograph base maps. Table 2.3 illustrates miles of stream by type on the Rainwater WMA (CTUIR 2002).

Table 2-3. Rainwater Wildlife Area Stream Classification.

Stream Type*	Stream Miles
Type 1	0
Type 2	10
Type 3	8
Type 4	109

*Stream type definitions are those established by the Washington Forest Practices Act. Type 1 streams are all waters, within their ordinary high-water mark, inventoried as "shorelines of the state". Type 2 streams are segments of natural waters that are not classified as Type 1 streams and have a high fish, wildlife, or human use. Type 2 waters are used by substantial numbers of fish for spawning, rearing, and/or migration. Type 3 streams are segments of natural waters that are not classified as Type 1 or 2 waters and have a moderate to slight fish, wildlife, and human use. Type 4 streams are perennial waters of nonfish-bearing streams. Type 5 stream include segments of natural waters within the bankfull width of defined channels that are not Type 1, 2, 3 or 4 waters and which are seasonal nonfish-bearing streams.

2.3 Water Quality/Instream and Riparian Ecosystems

2.3.1 Introduction

The upper Umatilla Subbasin has historically been valued as a source of cool, clean, abundant water and habitat for resident and migratory fish. For the last 150 years increased demands on the watershed have degraded water quality conditions. ODEQ completed a TMDL and WQMP for the Umatilla Subbasin in 2001 (ODEQ 2001). Water quality impairments arise from a variety of variables and have resulted in many streams in the Umatilla Subbasin listed as water quality limited in accordance with Section 303(d) of the Clean Water Act of 1972. The TMDL uses turbidity as the target for reducing the amount of suspended material available for settling.

The CTUIR developed water quality standards in conjunction with EPA in 1999 in order to regulate water quality conditions. A TMDL that addresses stream temperature and turbidity, for which there is ample data to indicate water quality standards are not being met (CTUIR 2005). The TMDL establishes reduction goals for stream temperature and sediment and led to the completion of a WQMP in 2008 (CTUIR 2008). The CTUIR and other upstream users or management agencies will need to meet CTUIR water quality standards and established TMDL goals. The WQMP and associated monitoring plan will be implemented by the responsible entities to address these impairments.

The Upper Grande Ronde River Subbasin includes the river, all of its tributaries, and all lands that drain to its tributaries upstream of the confluence of the Wallowa River at Rondowa. In 2000 ODEQ completed a TMDL and WQMP for the Subbasin (ODEQ 2000). The TMDL analyzed the factors affecting water quality and identified the amount of pollution that can be present without violating state water quality standards. The standards of concern included stream temperature, dissolved oxygen, and pH. The pollutants responsible for these water quality problems include excess heat and sediments that enter the streams as a result of human induced changes to streamside vegetation and to stream channel changes. The TMDL established targets (allocations) for reducing these pollutants so that water quality standards can be achieved. The WQMP described the actions that will be taken to reduce the pollutant loads identified in the TMDL. The highest priorities included improving riparian vegetation, in-stream flow, and stream channel characteristics.

2.3.2 Stream Temperature

Water temperature is a concern throughout most of the Umatilla River drainage from May until early November (periods of low flow). ODEQ (2001) listed 287 miles of the Umatilla Subbasin as impaired for elevated water temperatures including the entire mainstem Umatilla River. The CTUIR (2005) listed seven streams, or segments of streams, within the UIR as water quality limited for temperature (CTUIR 2005) (Figure 2-2). The highest water temperatures have been recorded in late July and early August when ambient air temperatures are high. During this period, the Umatilla River warms rapidly from the headwaters to the mouth, reaching sub-lethal (64°F to 74°F) and incipient lethal temperatures (74°F to 80°F) for salmonids throughout its entire length. Most of the tributaries where temperature data were collected also reached sub-lethal and incipient lethal ranges for salmonids (ODEQ 2001).

The ODEQ’s 1998 303(d) List of Water Quality Limited Waterbodies identified nine parameters of concern in the upper Grande Ronde Subbasin. These are algae, bacteria, dissolved oxygen, flow modification, habitat modification, nutrients, pH, sedimentation and temperature. All of these concerns exist within the Grande Ronde Valley portion of the subbasin. Three of these nine concerns – temperature, sediment and habitat modification – are widespread throughout the rest of the Subbasin outside the Grande Ronde Valley.

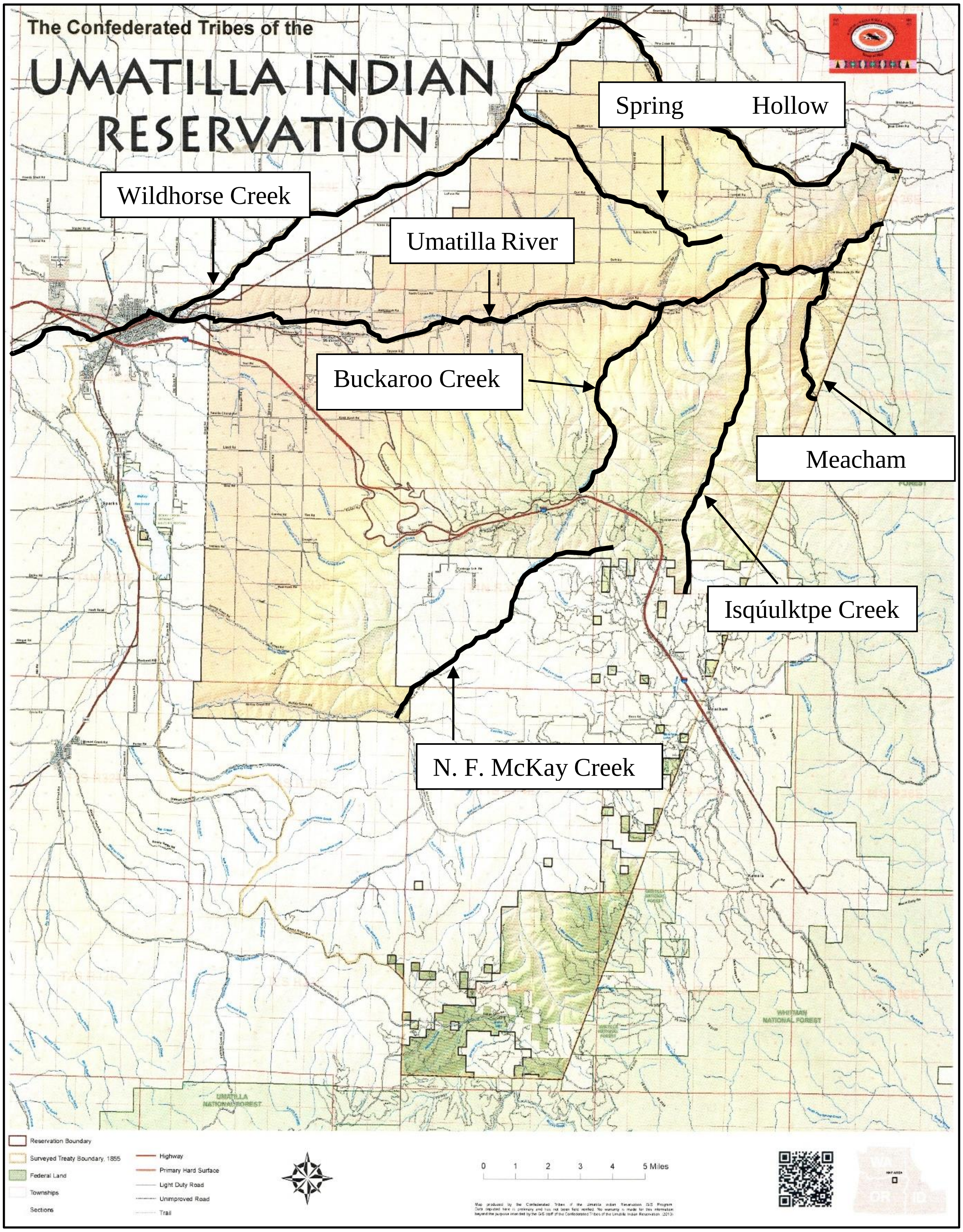

Figure 2-2. Stream Segments on the Umatilla Indian Reservation listed as Water Quality Limited by the CTUIR for Temperature.

The South Fork Touchet River has much higher stream temperatures than the North and Wolf Forks (Stohr et al. 2007). Development of shrub and/or tree layers in the riparian zone of the South Fork Touchet River will be to reduce stream temperatures. In addition, the substrate in the South Fork Touchet River is primarily bedrock. The South Fork likely will not be able to reach temperatures as low as those found in the other upper forks due to the lack of cobble and gravels to encourage subsurface streamflow and exchange.

2.3.3 Sediment and Turbidity

The Umatilla River produces large amounts of sediment, much of which originates from the weathered basalt and unconsolidated loess deposits--the dominant geology in the basin. The primary sources include both bank and upland erosion of tributaries and tributary watersheds (respectively), both of which may be accelerated by land uses (ODEQ 2001). The dominant erosion processes in the Subbasin are surface erosion by sheetwash, rills and gullies, and bank erosion (ODEQ, 2001). Peak sedimentation usually occurs during rainstorms or snowmelts associated with freeze and thaw periods (NPCC 2004a).

Both the CTUIR and the State of Oregon have established numeric water quality standards for suspended solids or streambed fines (CTUIR 2005; ODEQ 2001). Umatilla Basin fisheries managers determined through basin-specific knowledge and literature review that a turbidity of 30 nephelometric turbidity units (NTU) (not to exceed a 48-hour duration) standard will protect aquatic species (ODEQ 2001). The 30 NTU maximum was correlated to a level of total suspended solids to derive watershed target concentrations and loading capacities. This threshold was then used in the TMDL to determine a reduction target for each sub-watershed. One of the sediment-impaired stream segments that significantly deviated from the target standard was Wildhorse Creek (at its confluence with the Umatilla River), which had a peak turbidity value of over 5,000 NTU measured on April 23, 1997 (ODEQ 2001). The CTUIR identified segments of two streams, Umatilla River on the UIR and Mission Creek, on the UIR that do not meet water quality standards for turbidity.

As in the Umatilla Subbasin, the primary sources of sedimentation and turbidity in Meadow Creek and McCoy Creek include both bank and upland erosion assumed to be primarily due to timber harvests and livestock grazing. In addition, portions of Meadow and McCoy Creek were channelized with a corresponding loss of stabilizing riparian vegetation and a decrease in channel sinuosity. ODEQ (2000) identified segments of Meadow, McCoy, and McIntyre Creeks that do not meet water quality standards for turbidity and sedimentation.

Instream and riparian habitat in the Rainwater WMA have been dramatically impacted by past land management practices. Logging, road building, livestock grazing, and severe flooding events have altered hydrologic functions and instream and floodplain conditions. Extensive road development within floodplains, along streams, and on steep slopes have created slope instability, constrained floodplain function, and accelerated erosion and sediment delivery to fish bearing streams. Past logging, as evidenced by the abundance of large diameter tree stumps within the floodplain, coupled with flooding, removed structural stability and channel roughness, and altered groundwater elevations (CTUIR 2002).

2.3.4 Riparian Areas and Wetlands

Riparian areas contain the most biologically diverse habitats and species assemblages because of their variety of structural features (including live and dead vegetation) and proximity to water bodies (Quigley and Arbelbide 1997). Common deciduous trees and shrubs in riparian areas include black cottonwood (*Populus trichocarpa*), white alder (*Alnus rhombifolia*), willow (*Salix spp.*), and Rocky Mountain maple (*Acer glabrum*) (Bell 1988).

Healthy riparian plant communities increase bank stability, provides shade to moderate water temperatures, and adds large wood to instream habitats (Gregory et al. 1991). Increased bank stability reduces bank erosion and decreases sediment inputs. Large wood creates pool habitat for fish and macroinvertebrates and retains sediment, nutrients, and organic matter. Shade provided by riparian vegetation reduces solar radiation, lowering summer water temperatures and moderating winter cold water temperatures. Leaf litter provides seasonal inputs of organic matter.

Wetland habitats on the UIR and Rainwater have decreased in the past 100 years. Many wetlands in agricultural areas have been filled to increase tillable acres (Quigley and Arbelbide 1997). Based on limited analysis conducted by the CTUIR (1997), wetland losses in the upper Umatilla River range from 30 to 35 percent. The majority of wetlands are associated with riparian corridors and floodplains of the Umatilla River and its tributaries. These wetlands are primarily classified as palustrine and riverine systems and have a connection with surface water stream channels. Wetland losses have also occurred in the Meadow and McCoy Creek subwatersheds most noticeably associated in stream channelization along the lower reaches.

The CTUIR (2002) documented loss of wetland habitat along the South Fork of the Touchet River with < 9% hydrophytic vegetation cover and < 15% deciduous shrub and tree cover.

Continuous season long livestock grazing from late spring through early fall which was until recently the norm on the UIR has led to degradation of many riparian areas. Excess herbivory or trampling damage can lead to streambank erosion or sediment deposition, changes in channel geomorphology, and less soil moisture (Skovlin 1984). Other harmful impacts are defoliation of important plants at times that do not allow recovery or grazing at intensities that set back plant growth. During spring, livestock tend to disperse to uplands because of higher forage quality, better water distribution in shallow reservoirs and developed water sources and acceptable thermal conditions. During summer livestock tend to be attracted to riparian areas due to water availability, higher concentrations of nutritious palatable forage and preferable thermal conditions if trees or shrubs are present. During fall, livestock still tend to be attracted to riparian areas primarily due to water availability and the potential availability of browse with higher nutrient content.

2.4 Threatened, Endangered, and Candidate Fish and Wildlife Species

Seven (7) species of fish and wildlife that are listed under ESA as either threatened (T), endangered (E), candidate (C), or a species of concern (SC) by NMFS and USFWS are associated with habitats known to occur within the UIR and on lands owned by the CTUIR outside the UIR. (Table 2-4). NMFS defines an Evolutionary Significant Unit (ESU) as an anadromous fish population or group of populations that is substantially reproductively isolated from other conspecific populations and that represents an important component of the evolutionary legacy of the species.

2.4.1 Fish

Steelhead/Redband Trout *(Oncorhynchus mykiss*)

Umatilla Subbasin

Middle Columbia River ESU steelhead populations were listed as threatened by NMFS under ESA on March 25, 1999. Although total steelhead abundance in the area had been increasing, the majority of natural stocks had been decreasing at the time of the study. Riparian vegetation and in-stream habitat within this ESU have been heavily impacted by overgrazing, timber harvest, road building, and channelization, as well as past gold dredging and poor land management. These factors led to the conclusion by the NMFS that the Middle Columbia River steelhead is at risk of becoming endangered in the foreseeable future.

Table 2-4. Fish and Wildlife Federally Listed as Threatened. Endangered, and Candidate Species or Species of Concern Associated with Habitats on the UIR.

Species Name	Common Name	Federal Status	Critical Habitat
Fish			
Oncorhynchus mykiss	Mid-Columbia ESU Summer Steelhead	T	Designated
	Snake River Basin ESU Summer Steelhead	T	Designated
Oncorhynchus tshawytscha	Snake River Basin ESU Spring Chinook Salmon	T	Designated
Lampetra tridentatus	Pacific Lamprey	SC	N/A
Salvelinus confluentus	Bull Trout	T	Designated
Birds			
Coccyzus americanus	Yellow-Billed Cuckoo	T	N/A
Mammals			
Lynx canadensis	Lynx	T	Designated
Urocitellus washingtoni	Washington Ground Squirrel	C	N/A

In the last 32 years, adult steelhead returns have fluctuated in the Umatilla Subbasin in a similar pattern to steelhead in the John Day and other systems in the region with a low of 1,002 adults in 2019 to a high of 6,167 adults in 2015. Endemic steelhead are artificially supplemented using wild endemic broodstock to prevent domestication. Adult hatchery fish are passed above Three-Mile Falls Dam to provide harvest opportunities and to supplement natural production.

Spawning occurs in the mainstem of the Umatilla River primarily from Minthorn Springs (River Mile (RM 65) upstream and in the headwater tributaries. Major spawning tributaries include Birch Creek, Meacham Creek, and Isqúulktpe Creek.

Of the total 770 miles of stream in the Umatilla Subbasin, 233 miles are estimated to be suitable rearing habitat for juvenile steelhead based on water temperatures and persistent flows (Contor et al. 1996). During the late fall, winter and early spring, juvenile steelhead are observed throughout the Subbasin including reaches that are often intermittent during the summer. Juvenile steelhead have been observed in the lower reaches of Patawa Creek. During spring and early summer, juvenile steelhead move into the higher quality habitat areas associated with headwater streams, spring areas, and the upper reaches of the Umatilla River. Steelhead rearing streams include, but are not limited to, Meacham Creek, Isqúulktpe Creek, Buckaroo Creek, Boston Canyon Creek, Mission Creek, and Coonskin Creek.

Touchet Subbasin

Middle Columbia River ESU steelhead populations are the only naturally occurring anadromous fish currently present in the Walla Walla Subbasin. The Walla Walla Subbasin historically supported significant runs of spring Chinook salmon and summer steelhead. Van Cleve and Ting (1960) indicated that the South Fork Touchet River supported the largest runs of steelhead of any stream in the Touchet River system when surveyed in 1935. Currently, habitat diversity, sediment load, temperature, and flow are the primary limiting factors. Steelhead rearing streams include, but or not limited to, the South Fork Touchet River, Wolf Creek, and the North Fork Touchet River.

Grande Ronde Subbasin

Snake River Basin summer steelhead ESU were originally listed as threatened by NMFS under the ESA on August 18, 1997. The Snake River Basin steelhead ESU includes all naturally spawned summer steelhead originating below natural and manmade impassable barriers in the Snake River Basin. In 2005, the NMFS designated critical habitat for the Snake River Basin ESU of summer steelhead.

Adult Snake River Basin summer steelhead generally return to the Columbia River from June to August. Once the fish enter the Columbia River estuary, their timing of upstream migration at Bonneville Dam varies with age, size, and distribution of the fish. Most wild fish pass the Dam earlier than hatchery fish. The peak passage of Snake River Basin steelhead has shifted by about two weeks from late July to early August, probably in response to warming temperatures and reduced flows in the river.

Most Snake River Basin summer steelhead arrive in the Snake River and tributaries in early fall. After holding over the winter, summer steelhead spawn the following spring (typically from March to May). Snake River steelhead use high-elevation tributaries (typically 3,000–6,000 feet above msl) that are colder than many lower elevation tributaries for juvenile rearing.

The Oregon Department of Fish and Wildlife (ODFW) conducted summer steelhead spawning ground surveys in the Meadow Creek Subbasin from 1990 to 2010. The CTUIR has conducted steelhead spawning ground surveys since 2010 on the McCoy Meadows Ranch. In general, the data indicate a decline in the number of steelhead spawning in Meadow Creek and a relatively stable number of steelhead spawning in McCoy Creek until 2015. However, during this period, ODFW and/or the CTUIR observed no steelhead redds in 1994, 2000, 2004, 2007, 2009, 2011. The last observed steelhead redds in McCoy Creek were in 2015.

The alteration of tributary habitats due to past and/or present land use remains a concern for Grande Ronde River summer steelhead populations. NMFS identified four primary interrelated limiting factors that reduce the viability of all Northeast Oregon steelhead populations: excess fine sediment, water quality (primarily temperature), water quantity (primarily low summer flows), and habitat quantity/diversity (primarily limited pools and lack of large wood).

Spring Chinook Salmon (Oncorhynchus tshawytscha)

Spring Chinook salmon are indigenous to the Grande Ronde River Subbasin and were historically distributed throughout the river system. Twenty-one tributaries supported spring Chinook runs, contributing to large, documented runs in the subbasin. Spring Chinook spawning escapement in the Subbasin was estimated at 12,200 fish in 1957 (ACOE 1975). Recent escapement levels have numbered fewer than 1,000 fish. Snake River Spring Chinook salmon were listed as threatened under the ESA on April 22, 1992. NMFS designated critical habitat on October 25, 1999, in all river reaches including adjacent riparian zones, and tributaries within the range of this ESU.

Pacific Lamprey (*Entosphenus tridentatus*)

Pacific lamprey belong to a primitive group of fishes that are eel-like in form but lack the jaws and paired fins of true fishes. Pacific lamprey have a round sucker-like mouth, pore-like gill openings, and no scales. Adult Pacific lamprey are characterized by the presence of three large anterior teeth and many smaller posterior teeth on the oral disc.

Historically, Pacific lamprey were abundant in the Umatilla Subbasin (Close et al. 1995). The CTUIR harvested lamprey at the current site of Three-Mile Falls Dam and in the North and South Forks of the Umatilla River (Lane and Lane 1979). After spending one to three years in the ocean, Pacific lampreys cease feeding and migrate to freshwater between February and June. They are thought to overwinter and remain in freshwater for approximately one year before spawning. Most upstream migration takes place at night.

Pacific lamprey spawn in habitat similar to salmon, in gravel bottomed streams at the upstream end of riffles. Spawning occurs between March and June. The degree of homing is unknown, but adult lamprey cue in on ammocoetes which release pheromones that are thought to aid adult migration and spawning location. Ammocoetes burrow in substrate where they live and grow three to seven years feeding primarily on diatoms and algae. Ammocoetes move downstream as they age and during high flow events.

Metamorphosis to the juvenile phase occurs over several months beginning in the summer and completing by winter. As development occurs, the juveniles leave the substrate and move downstream. They immigrate to the ocean between late fall and spring where they mature into adults.

The CTUIR are currently implementing efforts to establish Pacific lamprey in the Umatilla Subbasin. The CTUIR translocated over 4,900 adult Pacific lamprey into the Umatilla Subbasin from 2000 through 2017. Between 2006 and 2021 adult lamprey returns to Three-Mile Falls Dam as a result of these efforts have ranged from six in 2010 to 4,700 in 2018. The current distribution of Pacific lamprey in the Umatilla River is limited primarily to the mainstem and Meacham Creek.

The CTUIR are also implementing efforts to establish Pacific lamprey in the Grande Ronde and Walla Walla Subbasins. From 2015 through 2017, the CTUIR translocated 2,100 adults in the Grande Ronde Subbasin. The CTUIR placed approximately 1,050 of these adults in the Upper Grande Ronde River. In 2018, the CTUIR out planted 250,000 larvae in the Walla Walla Subbasin.

Bull Trout (*Salvelinus confluentus*)

Umatilla Subbasin

The USFWS considers the bull trout population in the Umatilla Subbasin a part of the Columbia River Distinct Population Segment (DPS), which is analogous to an ESU. Historically, fluvial bull trout had access to the Columbia River and its tributaries and been connected to populations in adjacent basins forming a larger metapopulation (Buchanan et al. 1997). Populations were listed as threatened by the USFWS under ESA on June 10, 1998. Construction of Three-Mile Falls Dam and McKay Dam have impacted the fluvial bull trout population and prevented access to and from the Columbia River.

Bull trout have the most stringent habitat requirements of any fish species inhabiting the Umatilla Subbasin. They require cold water of the highest quality and stable, complex habitat. Their distribution in the Subbasin is limited, but encompasses areas not occupied significantly by other species. The USFWS, ODFW, and CTUIR have identified two local populations in the Umatilla Subbasin – the Upper Umatilla population and the Meacham Creek population. Because of poor water quality in much of the Umatilla Subbasin, bull trout are isolated in the headwaters of the Umatilla River and Meacham Creek (ODFW 2005). The viability of the Meacham Creek population is undetermined because of the low number of redds and fish observed in recent years. Spawning occurs primarily in the North Fork of the Umatilla River but has been observed in the North Fork of Meacham Creek. From 2000 through 2017, the number of redds observed in the North Fork of the Umatilla River ranged from a high of 128 in 2000 to a low of 9 in 2016 (Howell et al 2018). Year-round use also occurs in the mainstem Umatilla River above Thorn Hollow, South Fork of the Umatilla River, Isqúulktpe Creek, Ryan Creek, and Meacham Creek.

Touchet Subbasin

Bull trout spawn and rear in the headwaters of the Touchet Subbasin, but the extent of their downstream movements is presently unknown. Surveys indicate spawning occurs primarily in the Wolf and North Forks of the Touchet River. Washington Department of Fish and Wildlife (WDFW) observations of bull trout redds from 1990 through 2017 ranged from 99 redds in 1994 to 9 redds in 2016 in the North Fork and 108 redds in 2017 to 4 redds in 1997 in the Wolf Fork. WDFW also observed redds in the Burnt Fork, a tributary to the South Fork of the Touchet River, from 2000 to 2002. Fish biologists believe the primary habitat recommendations are to reduce instream sediment and maintain or reduce stream temperatures (NPPC 2004c).

Grande Ronde Subbasin

Historically, bull trout were distributed throughout the Grande Ronde Subbasin. Limited information is available on historical distribution, but it is suspected that bull trout occurred in all major tributaries (West and Zakel 1993). The current distribution of bull trout is restricted to headwater areas and rivers with high quality habitat and highwater quality, which are primarily located on National Forest lands. A current systematic population estimate for the Grande Ronde subbasin bull trout is not available. While many Grande Ronde tributaries have not been surveyed, bull trout are generally found wherever water quality and habitat permit.

2.4.2 Birds

Yellow-Billed Cuckoo (*Coccyzus americanus*)

The USFWS determined that listing the Yellow-Billed Cuckoo Western DPS as threatened was warranted on October 3, 2014. Historically, the Yellow-Billed Cuckoo was found throughout much of the west, most commonly in California and Arizona. In Oregon, the last breeding records of Yellow-Billed Cuckoo were in the 1940s. Loss of habitat and fragmentation are the greatest threats to the Yellow-Billed Cuckoo. Causes of riparian habitat loss include conversion to agricultural uses, dams, stream channelization and stabilization, livestock grazing, and replacement of native riparian habitat with non-native species.

Yellow-Billed Cuckoos are migratory, arriving in Oregon in mid-May and leaving for wintering grounds in September. Yellow-Billed Cuckoos breed in dense willow and cottonwood stands in river floodplains. If present in the Umatilla Subbasin, their distribution would most likely be limited to such stands along the mainstem Umatilla River.

2.4.3 Mammals

Mammals

Canada Lynx (*Lynx canadensis*)

The USFWS determined in March of 2000 that listing of the Contiguous U.S. DPS of lynx was warranted due to the lack of protection for lynx in the programs, practices, and activities of federal land management agencies. Lynx are almost exclusively carnivorous and are dependent on the snowshoe hare (*Lepus americanus*) as a primary food source. Other foods such as mice, squirrels, and grouse may be important seasonally or when hares are unavailable. Preferred habitat for the lynx consists of high elevation (>4,500 feet) stands of cold and cool forest types with a mosaic of structural stages for foraging and denning. Primary habitat consists of subalpine fir (*Abies lasiocarpa*), Engelmann spruce (*Picea engelmannii*), and lodgepole pine (*Pinus contorta*) (Ruediger et al. 2000; Ruggiero et al. 1999). Population density is usually less than 10 per 100 square kilometers.

Past extensive logging that eliminated habitat for lynx and its prey was detrimental. Habitat was also lost due to suppression of forest fires and plant succession to habitats that no longer support snowshoe and lynx. Other factors include habitat fragmentation and lack of immigration from Canadian populations.

The current population status and distribution of the Canada lynx in the Umatilla/Willow Subbasin is unknown. Surveys failed to detect the lynx within and adjacent to the Subbasin in 1999 and the species may have been extirpated from the area (Stinson 2001). The secretive nature of the lynx makes it difficult to conclusively establish its presence or absence. Lynx habitat occurs at higher elevations in the forested areas of the Subbasin off the UIR.

Washington Ground Squirrel (*Urocitellus washingtoni*)

Due to increasing threats to its habitat, the Washington ground squirrel candidate species listing under ESA was recently changed from priority 5 (species with high magnitude, non-imminent threats) to priority 2 (high magnitude, imminent threats). The primary threat to the squirrel's habitat is conversion to agricultural land, a change that cannot be remedied in the future. The Washington ground squirrel is also considered an agricultural pest and, in the past, has been the subject of control programs. Other factors that leave the squirrels highly vulnerable to extinction, especially on the periphery of the appropriate habitat range, are parasitism, predation, and weather.

Dry, open sagebrush or grassland habitat is preferable to Washington ground squirrel populations. Sandy soils are important for burrowing. The diet of the Washington ground squirrel consists of succulent vegetation, flowers, roots, bulbs, seeds, seed pods, and insects. Also consumed are cabbage, green peas, corn, oats, wheat, rye, barley, and alfalfa.

2.5 Essential Fish Habitat Chinook and Coho Salmon

2.5.1 Introduction

The Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996, requires federal agencies to consult with the NMFS on activities that may adversely affect EFH. The objective of the EFH assessment is to describe potential adverse effects to designated EFH for federally managed fisheries species within the proposed action area. It also describes conservation measures to avoid, minimize, or otherwise offset potential adverse effects to designated EFH resulting from the proposed action.

EFH for Pacific salmon means "those waters and substrate necessary for salmon production needed to support a long-term sustainable salmon fishery and salmon contributions to a healthy ecosystem. EFH includes all those streams, lakes, ponds, wetlands, and other currently viable water bodies and most of the habitat historically accessible to salmon in Washington, Oregon, Idaho, and California. Waters include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish. *Substrate* includes sediment, hard bottom, structures underlying the waters, and associated biological communities. *Necessary* means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem" (EFH Assessment Template).

Spring Chinook

The Umatilla River is believed to have once supported large runs of spring Chinook salmon, but the populations have since gone extinct (CTUIR and ODFW 1990). Van Cleve and Ting (1960) reported that there was a large return of Chinook salmon in 1914 and that Indians and non-Indians caught thousands and thousands of salmon from spring to fall. The last sighting of the Umatilla run of spring Chinook was in 1963 (ODFW 1986). Spring Chinook were reintroduced to the subbasin beginning in 1986 using Carson stock (CTUIR and ODFW 1990). Since reintroduction, returns of adult spring Chinook to Three Mile Falls Dam have fluctuated from a low of 68 in 1989 to a high of 7,016 in 2014. The current management objective is to return 8,000 adult spring Chinook salmon to the Umatilla River (excluding ocean and out-of-basin harvest) (NPCC 2004a). The spring Chinook population is considered a key species because of its historical presence, recently demonstrated natural production potential, and its tribal and non-tribal cultural significance.

There is an estimated 1,549 acres of spring Chinook spawning and rearing habitat in the Umatilla Subbasin (CTUIR and ODFW 1990). Most spring Chinook salmon spawn in the North Fork of the Umatilla and in the Umatilla mainstem from the Forks (RM 89.5) to the Bar M Ranch (RM 86). Minimal production also occurs in Meacham Creek and the North Fork of Meacham Creek. This restricted spawning range results from the high-water temperatures that occur downstream of RM 86 during the spawning and early incubation season (mid-August to mid-October) (NPCC 2004a). Distribution of the majority of juvenile spring Chinook rearing habitat is limited to the North Fork Umatilla River and the mainstem of the Umatilla River above the mouth of Meacham Creek. However, juvenile spring Chinook are also found in low numbers in the more favorable reaches of many of the tributaries used by juvenile steelhead (Contor 2004).

Fall Chinook

Fall Chinook salmon are believed to have returned to the Umatilla Subbasin and were known to be harvested in the fall by Native Americans and early settlers. Natural production potential is theoretically based on the juvenile life history patterns. State and Tribal authorities began hatchery releases of fall Chinook salmon in 1982 with Tule stock and switched to Upriver Bright stock in 1983 (CTUIR and ODFW 1990). The suitability of the Umatilla Subbasin for the natural production of fall Chinook in its current condition has remained a critical uncertainty. Production of fry has been documented even though redds have been scoured by high flow events and impacted with fine sediment (Contor 2004). Fry survival has been severely compromised by warm water temperatures during outmigration below Westland Dam, where most of the early summer flows are extracted. Additional water has been released into July during the last several years to assist downstream migration and enhance survival. Since 1995, adult fall Chinook returns to Three Mile Falls Dam have fluctuated between a low of 273 in 1998 to a high of 2,885 in 2013. The current management objective is to return 12,000 adult fall Chinook salmon to the Umatilla River (NPCC 2004a).

Naturally produced fall Chinook have the most restricted use of the subbasin of all anadromous fish species. Adults spawn in the mainstems mainly below RM 50.5 and juveniles' rear in these same areas before outmigration. In 1999, the CTUIR observed redds in the mainstem up to RM 67. Use of tributaries is minimal at all life stages.

Coho

Coho were reintroduced into the Subbasin in 1966 with Tanner Creek stock. The hatchery program stopped in 1969 and did not pick up again until 1987. Since 1995**,** adult returns to the Umatilla River have varied from 662 in 1996 to 23,247 in 2001. It is difficult to compare the current vs. historic distribution of coho in the subbasin because the historic distribution is unclear. Records specifically stating that coho were in the Umatilla River or Willow Creek are not available. Adult coho salmon returning to the Umatilla River typically enter the river from mid-September through mid-December (NPCC 2004a).

Spawning survey crews have observed coho redds and spawned-out adult carcasses through the years in the Umatilla River from the mouth to Meacham Creek. Coho have been observed in low numbers in some of the mid-basin tributaries such as Isqúulktpe Creek, Buckaroo Creek and Meacham Creek. Naturally produced juvenile coho have been observed throughout the lower mainstem Umatilla River and in the lower portions of the mid-basin tributaries such as Mission Creek, Moonshine Creek, Buckaroo Creek and Tutuilla Creek.

2.5.2 Environmental Baseline for the Proposed Action

Umatilla Subbasin

Water quality impairments arise from a variety of variables and have resulted in many streams in the Umatilla Subbasin listed as water quality limited in accordance with Section 303(d) of the Clean Water Act of 1972 (Table 2-5).

Water temperature is a concern throughout most of the Umatilla Subbasin during periods of low flow (May until early November). The highest water temperatures occur in late July and early August when ambient air temperatures are high. During this period, the Umatilla River warms rapidly from the headwaters to the mouth, reaching sub-lethal (64-74°F) and incipient lethal temperatures (74-77°F) for its entire length (Boyd et al. 1999). Many of the tributaries also reach sub-lethal and incipient lethal ranges for salmonids (Boyd et al. 1999).

Excessive stream temperatures in the Umatilla Subbasin are influenced primarily by non-point sources including riparian vegetation disturbance (reduced stream surface shade), summertime diminution of flow, and channel widening (increased surface area exposed to solar radiation) (ODEQ 2001).

Belt et al. (1992) found that channelized flow from intermittent and small streams into larger perennial streams is a primary source of sediment in mountainous regions. There are significant variations in sediment yields depending on landforms and stream type combinations. Present sediment yields are above "natural rates" in most Hydrologic Unit Codes (HUC) on non-forested areas of the UIR due to extensive replacement of native vegetation by exotic plants and agriculture as well as the extensive road network.

Neither EPA nor ODEQ has established numeric water quality standards for suspended solids or streambed fines. However, an instream turbidity standard of 30 NTU's, which does not exceed a 48-hour duration should protect aquatic species (ODEQ 2001). The TMDL uses turbidity as the target for reducing the amount of suspended material available for settling.

Table 2-5. Water Quality Impaired Streams on the UIR Portion of the Umatilla Subbasin.

Parameter	Stream	Segment	Criterion
Temperature	Buckaroo Creek	Mouth to Headwaters	Rearing 64^{o} F
	Meacham Creek	Mouth to Headwaters	
	Isqúulktpe Creek	Mouth to Headwaters	
Sediment	Boston Canyon Creek	Mouth to Headwaters	>30 Nepholometric Turbidity Units, (NTU) for 48 hours
	Buckaroo Creek	Mouth to Headwaters	
	Coonskin Creek	Mouth to Headwaters	
	Cottonwood Creek	Mouth to Headwaters	
	Mission Creek	Mouth to Headwaters	
	Umatilla River	Wildhorse Creek to Forks	
Habitat Modification	Boston Canyon Creek	Mouth to Headwaters	ODFW Habitat Benchmarks
	Buckaroo Creek	Mouth to Headwaters	
	Coonskin Creek	Mouth to Headwaters	
	Cottonwood Creek	Mouth to Headwaters	
	Meacham Creek	Mouth to Headwaters	
	Mission Creek	Mouth to Headwaters	
	Moonshine Creek	Mouth to Headwaters	
	Umatilla River	Wildhorse Creek to Forks	

ODEQ (2001) used habitat benchmarks developed by ODFW to identify water quality impaired streams in the Umatilla Subbasin. ODEQ compared the habitat benchmarks against standardized habitat surveys (Moore et al. 1999) to determine if stream reaches were water quality impaired.

These standardized habitat surveys gathered data on habitat features known to be important to salmonids such as presence and amount of large woody debris, pool frequency, presence of eroding stream banks, type and amount of riparian vegetation, stream channel form and pattern, and the proportion of substrate composed of fine materials (NPCC 2004a).

Touchet Subbasin

The CTUIR (2002) rated habitat conditions as poor in the South Fork Touchet River and fair in the upper portions of the Griffin Fork. Past land management practices and natural events including timber harvest and associated road construction, livestock grazing, and severe floods have dramatically altered hydrologic functions, instream and floodplain habitat conditions, and the successional stage of upland and riparian plant communities.

Road construction within floodplains and along streams as well as on steep slopes created slope instability, constrained floodplain function, and accelerated erosion and sediment delivery to fish bearing streams on the Rainwater Wildlife Area. Timber harvest in the floodplain along with severe flood events removed structural stability and channel roughness and altered groundwater elevations. Table 2-6 displays a summary of the watershed limiting factors.

Table 2-6. Water Quality Impaired Streams on the Rainwater Wildlife Area Portion of the Touchet Subbasin.		
Parameter	Stream	Criterion
Temperature	South Fork Touchet River	Rearing 64° F
Streambank Stability	South Fork Touchet River Griffin Fork	>80 % >90 %
Width: Depth Ratio (Bank Full)	South Fork Touchet River Griffin Fork	<29.3 <16.6
Large Woody Debris	South Fork Touchet River Griffin Fork	>60 Pieces/Mile
Pool Frequency and Quality	South Fork Touchet River Griffin Fork	>20 Large Pools/Mile
Riparian Condition	South Fork Touchet River Griffin Fork	>70 % Canopy Closure 50-80 % Cover Hydrophytic Vegetation >50 % Deciduous Cover > 40 Feet Average Height Overstory Vegetation

McCoy Meadows Ranch – Upper Grande Ronde Subbasin

As with the Umatilla Subbasin and the Touchet Subbasin, most water quality and instream fisheries habitat problems in the Upper Grande Ronde Subbasin are the result of the cumulative effects of timber harvest and associated road building, livestock grazing and rural development. Table 2-7 list the water quality impaired streams associated with the McCoy Meadows Ranch in the Upper Grande Ronde Subbasin.

Table 2-7. Water Quality Impaired Streams on the McCoy Meadows Ranch Portion of the Upper Grande Ronde River Subbasin.

Parameter	Stream	Segment	Criterion
Temperature	Meadow Creek	Mouth to Headwaters	Rearing 64^{o} F
	McCoy Creek	Mouth to Headwaters	
	McIntyre Creek	Mouth to Headwaters	
Sediment	Meadow Creek	Mouth to Headwaters	>30 Nepholometric Turbidity Units, (NTU) for 48 hours
	McCoy Creek	Mouth to Headwaters	
	McIntyre Creek	Mouth to Headwaters	
pH	Meadow Creek	Mouth to Headwaters	
Habitat Modification	Meadow Creek	Mouth to Headwaters	ODFW Habitat Benchmarks
	McCoy Creek	Mouth to Headwaters	
	McIntyre Creek	Mouth to Headwaters	

2.6 Wildlife/Wildlife Habitat

Approximately 378 wildlife species are known to occur in the Blue Mountains of Oregon and Washington (Thomas 1979). In the Blue Mountains, 77 wildlife species in the Blue Mountains depend on grass-forb communities for reproduction, including 15 species of birds. Primary causes for a decline in habitat for many of these species are excessive livestock grazing, invasion of exotic plants, and conversion of land to agriculture in native grassland. Altered fire regimes are also responsible for declines in steppe habitats. Primary causes for decline in old growth forest habitat are intensive timber harvest and fire exclusion. Fire exclusion is also responsible for a decline in early seral habitats.

Vegetation structure strongly influences bird community composition and may affect nest survival. Live vegetation height and height-density have been shown to be greatest in ungrazed pastures, followed by rotational pastures with refuges (areas with no grazing between May 15 and July 1), and lowest in pastures grazed continuously (Bartelt 1997). In the same study, ungrazed refuges were found to have the greatest densities of grassland birds, followed by rotationally grazed pastures, then continuously grazed pastures. Higher nest success rates have been observed in rotational grazing systems than in continuous grazing systems.

The Blue Mountains provide year-round habitat for Rocky Mountain elk (*Cervus elaphus*), mule deer (*Odocoileus hemionus*), and white-tailed deer (*Odocoileus virginianus*). Rocky Mountain elk populations peaked in the early 1980’s and started declining in the late 1980’s and early 1990’s. Mule deer populations increased from the 1930’s, peaking in the mid 1950’s through the mid 1960’s. Prior to 1980, mule deer dominated the landscape in the Blue Mountains, with the exception of a few localized areas in the foothills. White-tailed deer populations were normally found along river drainages in the farmlands and in the foothills. Few white-tailed deer were observed at elevations above 4,500 feet. Over the last 20 years, white-tailed deer have expanded in distribution and number, now inhabiting most of the Blue Mountains.

The size of mule deer, white-tailed deer and Rocky Mountain elk populations are determined by several interrelated factors including the amount and quality of suitable habitat; sex and age ratios; population age structure; reproductive rates; harvest by humans; predation primarily by coyotes, bears, mountain lions, and gray wolves; other natural mortality; and severe weather events, i.e., drought or deep snow, and social tolerance. In Oregon, ODFW currently used the POP II computer software program to estimate population sizes for elk and deer (Bartholow 1992). The primary inputs for the software program are herd sex and age ratios, ages and productivity rates, harvest estimates, natural mortality including predation rates, initial population size, and weather severity. In Washington, WDFW conducts aerial surveys following protocols in a sightability model outlined by Unsworth et al. (1999) to estimate elk population size in the Blue Mountains. Sightability models estimate population size by correcting the number of observed animals by the number of missed animals due to incomplete detection. Detection is strongly influenced by group size, animal activity, amount and type of vegetation cover, and the presence or absence of snow. WDFW does not estimate the population size of deer.

The greatest densities of mule deer, white-tailed deer, and Rocky Mountain elk on the UIR occur during the winter and early spring. However, there have been substantial annual differences in numbers of these ungulates utilizing UIR habitats depending on winter severity and overall population sizes. During severe winters in the 1980’s, elk numbers exceeded 6,000 within the original boundary of the UIR. In addition, at least 3,000 mule deer and several hundred white-tailed deer also utilized the range and forest lands of the reservation. During the moderate winters of the late 1990’s and early 2000’s elk numbers did not exceed 2,000 within the original boundary of the UIR while mule deer numbers did not exceed 1,500. In addition, elk herds also experienced a decline in productivity during the same period, resulting in lower population sizes. The number of elk and mule deer that are year-round residents on the UIR is unknown. All these species are essential to support Tribal subsistence hunting needs.

The UIR and the McCoy Meadows Ranch are associated with three Game Management Units (GMU) managed by ODFW. The area north of Interstate 84 lies adjacent to the Mt. Emily Game Management Unit while the area south of Interstate 84 lies adjacent to the Ukiah Game Management Unit. The McCoy Meadows Ranch lies adjacent to the Starkey Game Management Unit. ODFW population estimates for the three Game Management Units for the period 1988 through 2021 indicate that mule and white-tailed deer numbers as well as elk numbers declined during this period. In the 1980’s, the estimated population sizes for elk were well above management objectives. In response, ODFW established liberal antlerless elk hunting seasons to reduce population levels.

The Rainwater WMA in southeast Washington lies within the Dayton GMU. Along with other GMU’s the Dayton GMU provides habitat for the Blue Mountain Elk Herd. Since 1991, the WDFW estimates that size of the Blue Mountain Elk Herd has been below the management objective range of 4,950-6,050 animals in the winter except for the period 2009-2016.

2.7 Upland Plant Community Composition/Invasive Plants

Synergy Resource Solutions, Inc. (2009), under contract to the CTUIR, collected vegetation data on 66,356 acres on 11 of the 13 range units on the UIR in May and July 2009. The contract did not include Range Units 7 and 20 as those lands were not incorporated into range units at the time. The project's goal was to understand current vegetation conditions and to identify possible strategies for restoration of degraded plant communities. Data collected included plant species composition by weight, forage production, calculated livestock stocking rates, and modified similarity index.

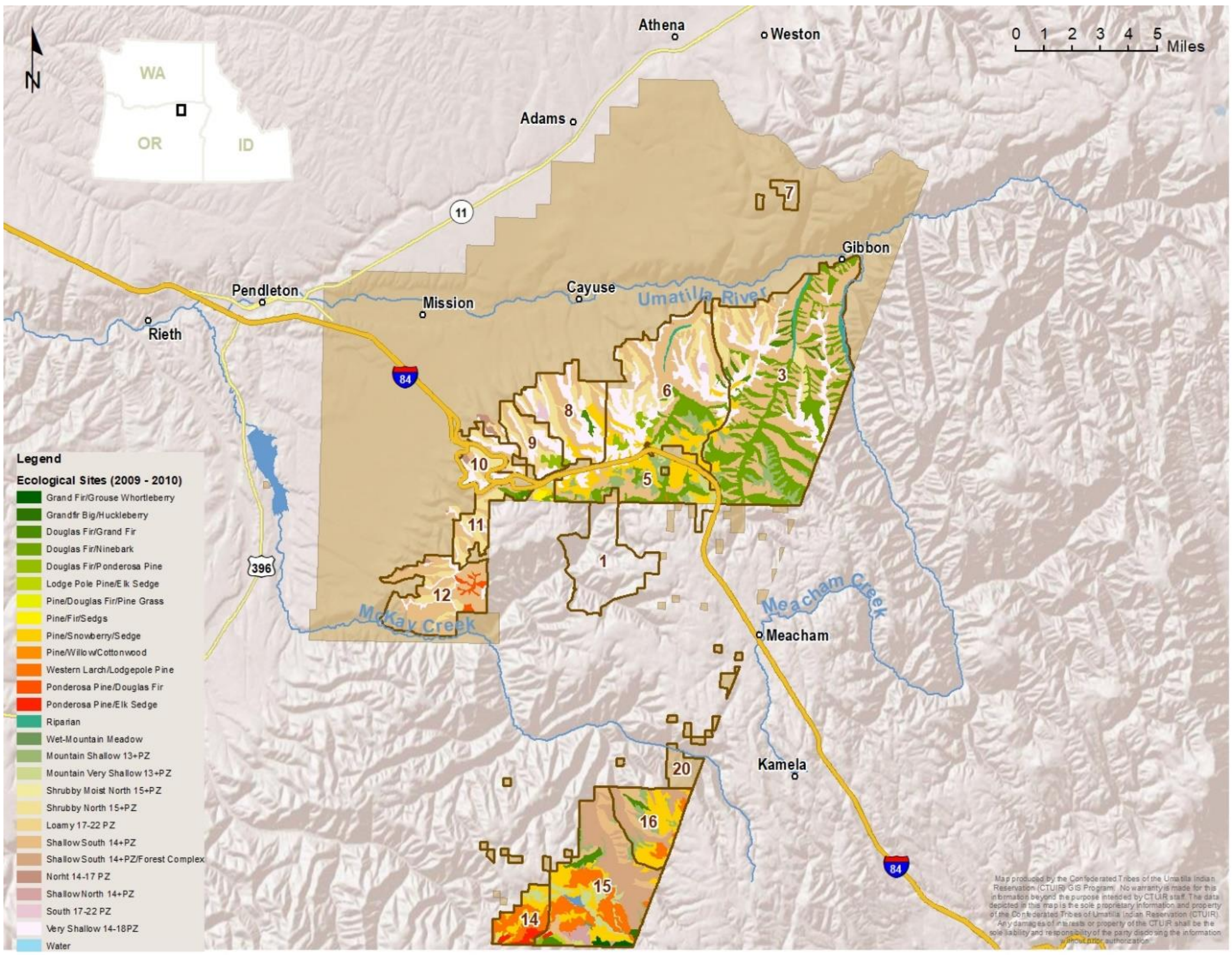

Figure 2-3. Rangeland Ecological Sites and Grazable Woodland Sites Delineated on the UIR by the 2009 Range Inventory.

DJ&A P.C. (2021), under contract to the CTUIR, collected vegetation data on 76,422 acres of rangeland and grazable woodland on 15 range units on the UIR in May through July 2021. Data collected included plant species composition by weight, forage production, calculated livestock stocking rates, and modified similarity index. This effort repeated the collection of vegetation data on those acres surveyed during the 2009 inventory and gathered additional vegetation data on

Range Units 7 and 20. The effort also gathered vegetation data on areas referenced as Range Units 1 and 17 which were established on lands acquired by the CTUIR established since 2009.

Synergy Resource Solutions, Inc. and DJ&A P.C. both used ecological sites as the basis to separate the project area into manageable units. An ecological site is a distinctive kind of land with specific physical characteristics that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation and in its response to management. An ecological site is the product of all the environmental factors responsible for its development and has key characteristics; i.e., soils, hydrology, vegetation; that are included in the ecological site description (ESD). Natural resource management professionals divide rangelands into ecological sites for the purposes of inventory, evaluation, and management. The natural plant community on an ecological site has a specific species composition that differs from that of other ecological sites in the proportion of each species and in annual production in the absence of disturbance.

Synergy Resources Solutions, Inc. (2009) identified 10 rangeland ecological sites in the project area surveyed on the UIR (Figure 2-3). Each ESD contains a quantitative description of the historical climax plant community including annual production of each species in pounds per acre (https://edit.jornada.nmsu.edu/catalogs/esd). However, no published ESD's existed for forest or riparian sites on the UIR. Therefore, Synergy Resource Solutions, Inc. delineated 16 forest and riparian sites based on soil textures and the dominant trees in the overstory (Table 2-8).

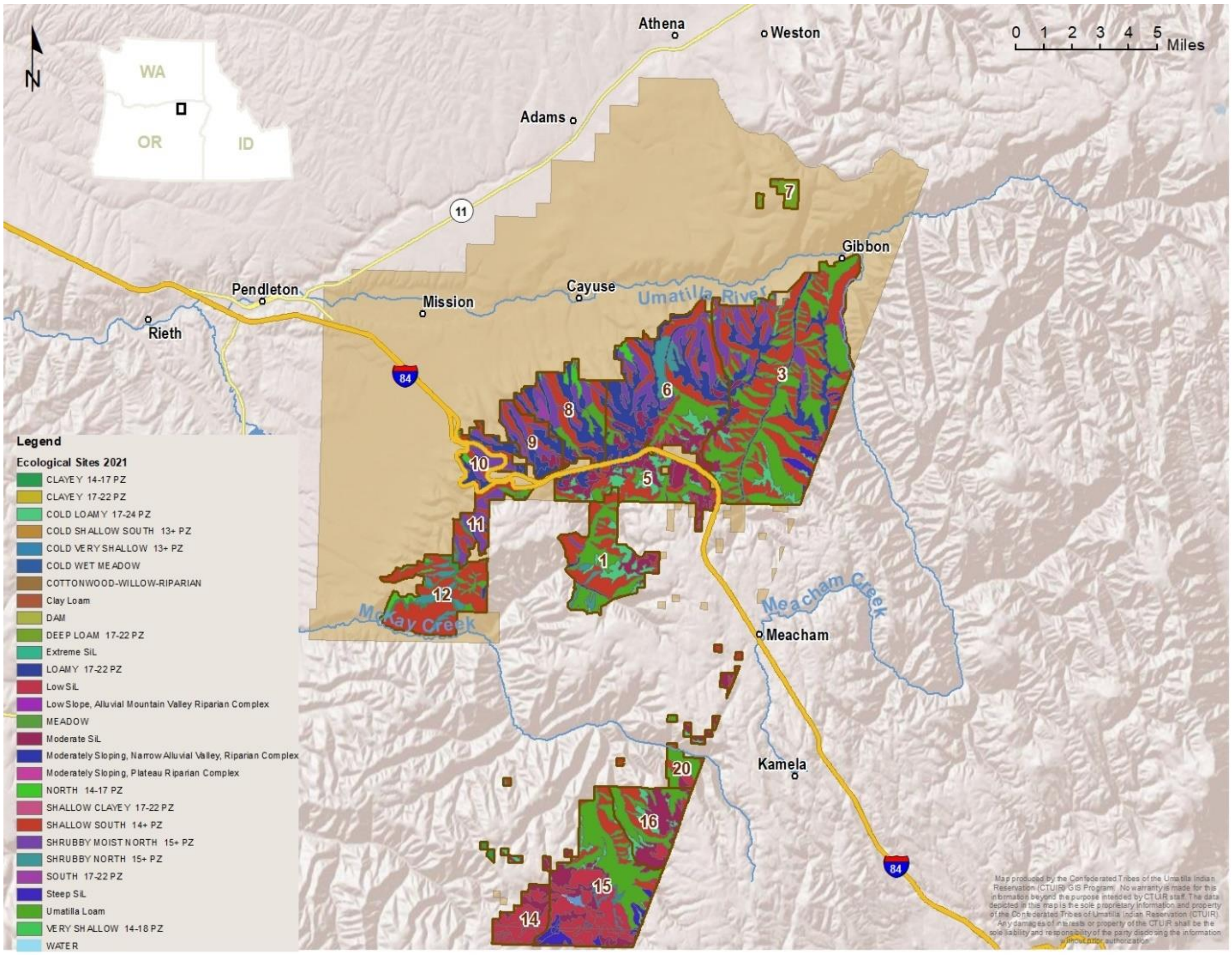

Figure 2-4. Rangeland Ecological Sites and Grazable Woodland Sites Delineated on the UIR by the 2021 Range Inventory.

The SI for range units with multiple samples (polygons of the same ecological site or multiple ecological sites) was then calculated as a weighted average based on acres (Table 2-9). The SI classes match the ratings for ecological condition by seral stage: low seral, mid seral, high seral, and the potential natural community. Synergy Resources Solutions Inc. (2009) did not calculate a SI for forest or riparian sites on the UIR since no published ESDs existed for these sites (Table 3-8). DJ&A P.C. (2021) did not calculate a similarity index for forest sites for the same reason (Table 2-10). Both Synergy Resources Inc., and DJ&A P.C. only evaluated forage production on these sites.

Table 2-8. Upland and Riparian Ecological Sites and Grazable Woodlands Sites on UIR Range Units Delineated During the 2009 and 2021 Inventory Efforts.

Site Name	Acres	Percent Total Area	Acres	Percent Total Area
Upland Ecological Sites	2009 Inventory		2021 Inventory	
Clayey 14-17 PZ ID R009XY015OR	Not Delineated		636	0.83

Clayey 17-22 PZ ID R009XY016OR	Not Delineated		666	0.85
Cold Loamy 17-24 PZ ID R009XY018OR	Not Delineated		3,451	4.52
Cold Shallow South 13+ PZ ID R009XY036OR	Not Delineated		25	0.03
Cold Very Shallow 13+ PZ ID R009XY027OR	1,572	2.37	198	0.26
Deep Loam 17-22 PZ ID R009XY014OR	Not Delineated		521	0.68
Loamy 17-22 PZ ID R009XY013OR	260	0.39	8,915	11.68
Meadow ID R0010XY004OR	Not Delineated		200	0.26
Mountain Shallow 13 + PZ ID R009XY022OR	2,833	4.27	Not Delineated	
North 14- 17 PZ ID R009XY040OR	379	0.57	910	1.18
Shallow Clayey 17-22 PZ ID R009XY021OR	Not Delineated		168	0.22
Shallow North 14+ PZ ID R009XY 060OR	276	0.42	Not Delineated	
Shallow South 14+ PZ ID R009XY031OR	20,299	30.59	20,127	26.38
Shrubby Moist North 15+ PZ ID R009XY046OR	81	0.12	6115	8.01
Shrubby North 15+ PZ ID R009XY060OR	6,595	9.94	1685	3.21
South 17-22 PZ ID R009XY030OR	291	0.44	271	0.35
Very Shallow 14-18 PZ ID R009XY025OR	9,423	14.20	173	0.22
Total	42,009	63.31	44,056	57.76

Table 2-8. Upland and Riparian Ecological Sites and Grazable Woodlands on UIR Range Units Delineated During the 2009 and 2021 Inventory Efforts Continued.				
Site Name	Acres	Percent Total Area	Acres	Percent Total Area
Riparian Ecological Sites	2009 Inventory		2021 Inventory	
Riparian	577	0.87	Not Delineated	
Wet Mountain Meadow	20	0.03	Not Delineated	
Cold Wet Meadow ID R010XY001OR	Not Delineated		16	0.02
Cottonwood-Willow-Riparian ID R010XY011OR	Not Delineated		294	0.38
Low Slope, Alluvial Mountain Valley Riparian Complex	Not Delineated		232	0.30

ID R009XY502OR				
Moderately Sloping Narrow Alluvial Valley Riparian Complex ID R009XY503OR	Not Delineated		488	0.64
Moderately Sloping Plateau Riparian Complex ID R009XY504OR	Not Delineated		17	0.02
Total	597	0.90	1,047	1.36
Grazable Woodlands				
Various Forest Sites	23,747	35.79	31,182	40.88
Total	23,747	35.79	31,182	40.88
Grand Total	66,653	100.00	76,285	100.00

Direct comparisons between the 2009 and 2021 inventories are difficult. The differences in the calculated SI's between the 2009 and 2021 inventories are due to: (1) different sample point locations and sampling intensity, (2) different delineation of ecological sites, and (3) different precipitation and temperatures during the growing seasons for 2009 and 2021. In many cases, Synergy Resources Solutions Inc. and DJ&A P.C. measured vegetation composition at different sample points within an ecological site polygon. Synergy Resources Solutions Inc. measured vegetation composition/production on 164 sample locations. In addition, the firm ocularly determined vegetation composition/production on 342 sample locations. DJ&A P.C. measured vegetation composition/production on 120 sample locations and ocularly determined vegetation composition/production on 37 sample locations. The NRCS modified the ESD's to match soil mapping units more closely in the period between the two inventories resulting some differences in delineation of ecological sites.

Table 2-9. Similarity Index for Rangeland Ecological Sites on Range Units of the UIR in 2009.

Range Unit	Weighted Average Percent SI	Percent of Range Unit SI <25% Low Seral Stage	Percent of Range Unit SI 25-50% Mid Seral Stage	Percent of Range Unit SI 50-75% Late Seral Stage	Percent of Range Unit SI >75% PNC
3	43	13	66	11	10
5	21	64	22	11	3
6	28	50	33	13	4
8	27	50	37	13	0
9	24	52	36	12	0
10	29	67	8	25	0
11	54	12	11	77	0

12	39	25	49	25	0
14	19	81	19	0	0
15	31	33	38	29	0
16	49	42	8	0	50

Table 2-10. Similarity Index for Rangeland Ecological Sites on Range Units of the UIR in 2021.					
Range Unit	Weighted Average Percent SI	Percent of Range Unit SI <25% Low Seral Stage	Percent of Range Unit SI 25-50% Mid Seral Stage	Percent of Range Unit SI 50-75% Late Seral Stage	Percent of Range Unit SI >75% PNC
1	30.5	32	68	0	0
3	28.4	32	67	1	0
5	7.0	100	0	0	0
6	22.2	75	0	25	0
7	11.3	100	0	0	0
8	12.5	100	0	0	0
9	22.3	76	0	24	0
10	9.1	98	0	0	2
11	32.1	50	41	2	7
12	25.5	31	69	0	0
14	4.8	100	0	0	0
15	54.3	24	1	51	14
16	29.0	50	0	50	0
17	23.6	46	52	0	2
20	24.7	48	50	0	0

There was a substantial difference in precipitation for the period January through June between 2009 and 2021. Precipitation in Pendleton totaled 8.18 inches in 2009 but totaled only 4.34 inches in 2021 (Figure 2-5). The difference was even more pronounced for the March through June period when precipitation totaled 5.8 inches in 2009 but only 1.32 inches in 2021. Overall, mean monthly temperatures were warmer in 2021. Annual invasive vegetation likely had a competitive advantage over native perennial vegetation in 2021 indicating changes in SI may be skewed.

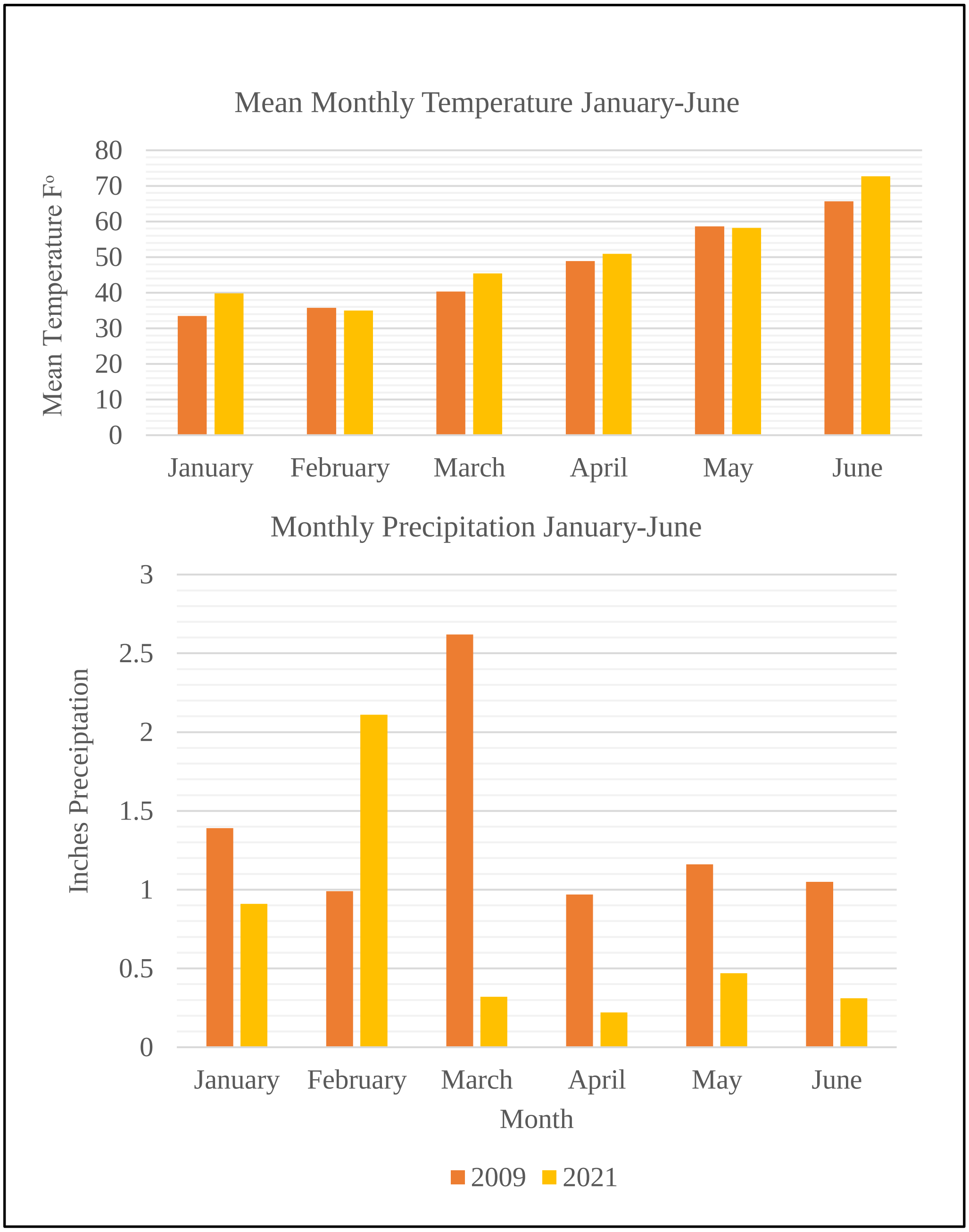

Figure 2-5. Precipitation and Mean Temperatures for January-June in 2009 and 2021.

Changes in management are unlikely to be a factor in the decline in calculated SI from 2009 to 2021. In 2016, the CTUIR removed 288 horses from rangelands south of the Umatilla River in accordance with the CTUIR Feral Horse Policy (CTUIR 2011). In 2012, the season of use on Range Unit 8 was changed from 5/15 through 10/31 to 4/15 through 6/30 and 10/1 through 11/15 in an attempt to increase use of annual grasses, reduce grazing intensity on native perennial plants during the growing season, and reduce livestock use in riparian areas. In 2017, the season of use on Range Unit 6 was changed to 4/15 through 7/1 for similar reasons. There was no authorized livestock grazing in Range Unit 3 from the mid-1990s through 2021. Range Units 3, 6, and 8 all showed declines in calculated SI from 2009 to 2021.

Invasive weeds occur in patches of varying size and densities in the UIR. Areas within or adjacent to human development, including roadsides, railroads, pipelines, transmission line rights-of-way, residential areas, and margins of agricultural fields are often highly infested with invasive weeds. The CTUIR (2018) published a list of invasive weeds known to occur on the UIR (Appendix A).

2.8 Historic Properties/Traditional Uses

Various cultural resource inventories have been completed and many historic properties recorded across the UIR. However, much of the UIR remains un-inventoried and only a fraction of the cultural resources are recorded. The UIR contains the entire spectrum of sensitive cultural resources significant to the CTUIR. The highest concern is ancestral burials. Additionally, archaeological resources on the landscape may include but are not limited to artifact scatters, camps, resource processing areas, management or procurement locations, transportation features, and refuse disposal areas. Based on the fact that historic and pre-contact archaeological sites are commonly located near springs, seeps, and creeks, it is likely that cultural resources will be identified at or near water sources. There are also many cultural resources located on specific landforms. Examples of cultural resource site types on the UIR include encampments, lithic scatters, lithic material quarrying sites, rock cairns, petroglyphs/pictographs, isolated artifacts, village/habitation sites, historic structures, historic refuse scatter, irrigation canals, allotment markers, grazing areas, and roads/trails.

Additionally, there are sites which may or may not have an archeological component but are nonetheless cultural resources. These include but are not limited to:

- Sacred Sites/Traditional Cultural Properties
- Historic Properties of Religious and Cultural Significance
- Legendary Sites
- Vision Quest Sites
- Traditional Gathering Sites
- Native Plants
- Hunting Areas
- Fishing Sites

From the CTUIR point of view, natural resources upon which Tribal members depend are cultural resources, whether they are within the UIR, in ceded lands, or at usual and accustomed fishing/hunting/gathering areas.

Improper livestock use by cattle, sheep, and domestic or feral horses over the last 100 years has affected many cultural resources within the UIR. While the CTUIR has not specifically identified the types and extent of impacts to most of these cultural resources, experimental research has demonstrated that livestock trampling can damage, break and dislocate artifacts (Nielsen 1991, Schoville 2017). Common livestock damage observed on archaeological sites includes trampling trail formation, wallowing, bedding, soil compaction, vegetation removal, rubbing on structural remains (e.g., using a historic cabin wall as a scratching post) and waste excrement. These actions can significantly impact and sometimes obliterate archaeological stratigraphy and site pattern features, exacerbate erosion, break, displace or mix artifacts and contaminate sediments and archaeological organic residues with fecal material and urine (EPA 1994). Past impacts by livestock are likely to have ranged from minor movement of surface artifacts to more severe damage to sites and artifacts. Factors likely contributing to the current physical condition of cultural resources are related to their time of exposure to livestock impacts. These factors include soil type, soil moisture, terrain type, season and intensity of use, and vegetation cover.

2.9 Climate Change

Scientists project the Pacific Northwest will become warmer and drier by the end of the 21st century along with a reduced snowpack in winter. Since the early 1900s, the average temperature across the Pacific Northwest has increased 1^{o} to 3^{o} F with more winter precipitation falling as rain instead of snow (Jansen and Winford 2020). Summer will likely experience the largest increase in temperature. The frequency of extreme heat events, when the temperature is over 100^{o} F, are likely to increase while the frequency of cold extremes will decrease. Weather patterns will become increasingly unpredictable as established weather patterns break down. Projections of annual precipitation vary between climate models with the strongest consistency in the various projections of decreased summer precipitation by as much as 30% by 2100 (Jansen and Winford 2020). Projections are that winter precipitation will increase slightly with associated increase in variability and extremes. Winter precipitation may fall as rain instead of snow in higher elevations where a snowpack historically accumulated. Warming temperatures will induce an earlier snowmelt with a corresponding decrease in summer base flows.

Projected changes in temperature and precipitation will affect growing conditions for rangeland plants. Climate scientists expect the frost-free period and growing degree days to increase. Warmer and drier conditions can increase the amount of water needed by plants during the growing season. However, the availability of soil water to plants will likely decrease especially in late summer resulting in plants experiencing earlier senescence and dormancy. Warmer and drier summers along with an expected increase in the occurrence of drought likely will decrease the amount of plant production.

Summer base flows in streams will likely decrease and negatively impact riparian vegetation. By 2080, Tetra Tech Inc. (2021) expects mean summer base flows in the Umatilla River to decrease by the following amounts: (1) between 1 and 10 cubic feet per second (cfs) in the North and South Forks of the Umatilla River, (2) between 10 and 20 cfs from the confluence of the North and South Forks to the mouth of Meacham Creek, (3) between 20 and 60 cfs from Meacham Creek to the mouth of Birch Creek, and over 60 cfs from Birch Creek to the Columbia River confluence. These decreases equate to an approximately 5-6% reduction in mean summer base flows. Tetra Tech Inc. also expects winter flows in the Umatilla River to increase by approximately 31%.

Climate change most likely will change the distribution of invasive annual grasses such as cheatgrass, medusahead, and red brome (*Bromus rubens*). These invasive annual grasses have expanded in low to mid elevation steppe and woodland vegetation types in the last 50 years (Jansen and Winford 2020). Warmer temperatures create earlier and longer growing seasons which tend to favor annual grasses due to reduced composition from native plants. Invasive annual grasses are likely to become more abundant at higher elevations.

Wildland fire seasons will lengthen with the warmer and drier climate. Already, large fires are becoming more frequent. Multiple variables from climate, vegetation type, and fuel bed characteristics to the amount of natural and human ignitions dictate the number, size and frequency of wildfires. Annual grasses create a continuous fuel bed in places where historically bunchgrasses and shrubs dominated with a patchier and fuel limited landscape (Jansen and Winford 2020).

Figures 2-6 and 2-7 summarize annual (1979-2021) total precipitation and mean temperatures respectively for Pendleton, Oregon. There is large variability in both total precipitation and mean annual temperature from year to year as one might expect. General trend lines appear to indicate a decrease in total precipitation and an increase in mean annual temperatures. However, R-squared values are low indicating a poor fit of the trend lines to the data. Analysis of the data by month indicates a decrease in precipitation from June through October and an increase in temperatures from June through September and January and February. Again, R-squared values are low indicating a poor fit of the trend lines to the data.

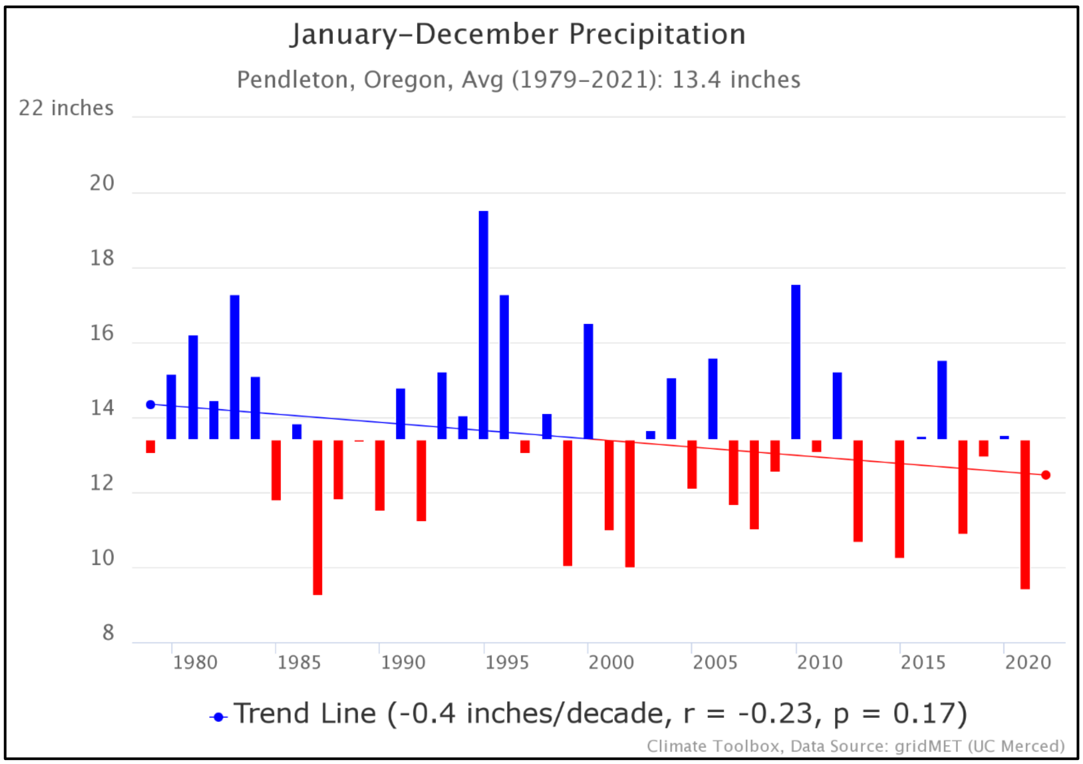

Figure 2-6. Total Inches of Precipitation Pendleton, OR 1980-2020.

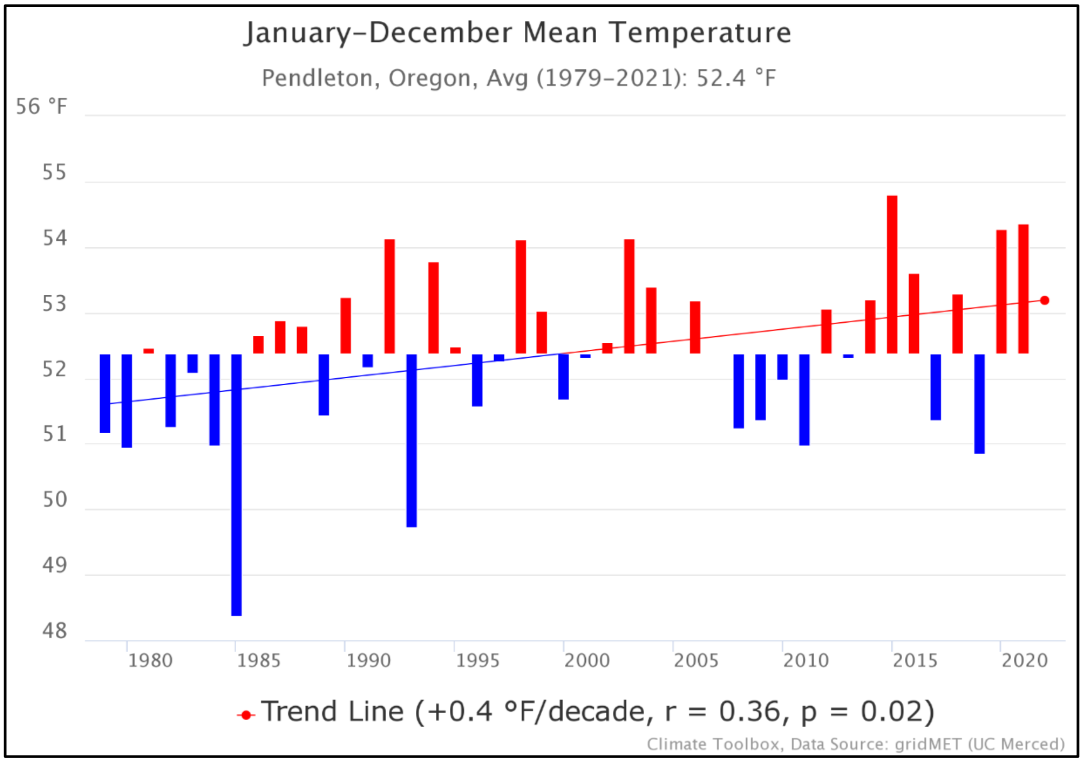

Figure 2-7. Mean Annual Air Temperature Pendleton, OR 1980-2020.

2.10 Fire Management

2.10.1 Fire Regimes and Fire Effects

Fire regimes are descriptions of the nature of fires occurring over an extended period. Fire regimes typically include information on the frequency and severity of fires for a given vegetation type. An average fire return interval is estimated for each fire regime and is defined as the average number of years between fire occurrences on a given piece of land. Fire return intervals are calculated for natural conditions and do not include the effects of fire suppression. Fire (burn) severity is a qualitative assessment of the effects of fire on the environment focusing on the loss of vegetation both above and below ground and also includes soil impacts (https://www.nwfirescience.org) Fire severity is representative of residual burning during and after the main fire front passes and is affected mainly by surface fuel loading. Low severity fires have limited effect on overstory trees (<30% or less mortality), understory vegetation and soils. Moderate severity fires produce variable moderate effects on overstory trees (30-80% mortality) and/or moderate soil exposure. High severity fires generate high overstory tree mortality (>80%) and/or extensive mineral soil exposure. Fireline intensity is the heat released per unit of time for each unit of length of the leading fire edge. Intensity is represented as follows: (1) low-less than two-foot flame length; (2) moderate-two to six feet flame length; and (3) high- six feet or more flame length. The amount of fire intensity (flame length) in the flaming front is largely dependent on the amount of moisture in the zero-to-three-inch diameter fuels at the time of the fire.

A natural fire regime reflects the role fire would play across a landscape in the absence of modern human intervention but including the possible influence of aboriginal fire use (Agee 1993). Agee (1996) defined three broad categories of fire regimes: (1) low severity fire regimes with frequent low intensity fires; (2) mixed severity fire regimes with complex combinations of low, moderate, and high severity fires; and (3) high severity fire regimes with infrequent but stand replacing fires. Barrett et al. (2010) defines five natural fire regimes based on the average number of years between fires or mean fire interval (MFI) together with characteristic fire severity that reflects percent replacement of dominant overstory vegetation (Table 2-11).

Fuel represents the whole array of combustible material in steppe and forest vegetation including: (1) surface, shrubs, all down woody material, litter, stumps, seedlings, saplings, and cured grasses; (2) ground-duff, roots, and decomposing logs; and (3) aerial (ladder fuels) - limbs, branches, foliage, lichens, and snags. Fires that climb vertically through continuous fuels (ladder fuels) from the surface up into aerial fuels are called crown fires. Crown fires can also occur independently of a surface fire. The potential for a crown fire to occur, based on stand structure, crown closure, and surface fuel models, can be describes as: (1) null-no chance of crown fire; (2) low-ground/surface fire with occasional torching; (3) moderate-passive torching occurs; (4) high-active fire readily consumes the crown sustained by the heavier surface fuel loading; and (5) extreme-independent fire moves through the crowns of tree canopy apart from the surface fire.

Table 2-11. Natural Fire Regimes.

Regime Group	Frequency	Severity	Severity Description
I	0-35 years	Low/Mixed	Generally, low-severity fires replacing less than 25% of the dominant overstory vegetation; can include mixed severity fires that replace up to 75% of the overstory
II	0-35 years	Replacement	High-severity fires replacing greater than 75% of the dominant overstory vegetation
III	35-200 years	Mixed/Low	Generally mixed-severity fires; can also include low-severity fires
IV	35-200 years	Replacement	High-severity fires
V	200+ Years	Replacement	Generally, replacement-severity; can include any severity type in this frequency range

2.10.2 Fire Regimes and Potential Vegetation Groups

A Potential Vegetation Group (PVG) is a group of potential vegetation types that have similar environmental conditions and are dominated by similar types of plants. Potential vegetation types can be identified by late seral indicator species with similar environmental requirements. Due to disturbance, other vegetation besides indicator species can occur on a potential vegetation type through time. Fire regimes vary with the PVG.

Potential vegetation is defined as the community of plants that would become established if all successional sequences were completed, without disturbance, under existing environmental conditions including edaphic, topographic, and climatic factors (Powell et al. 2007). Potential vegetation, the theoretical endpoint of plant succession in the absence of disturbance, is used to characterize biophysical settings and their associated potential natural communities. Powell et al. (2007) combined seven physiognomic classes with a temperature moisture matrix specific to each class to define PVGs. A PVG, which can be considered mid-scale, aggregate fine-scale potential vegetation types (PVT). PVG are not strictly equivalent to biophysical settings (BpS) because the delineation criteria for BpS typically incorporate physical or abiotic factors such as geology or geomorphology. The following discussion lists common PVGs on the UIR and associated lands along with indicator plant species for the PVG as well as associated fire regimes.

Bluebunch Wheatgrass/ Idaho Fescue Fire Regimes I and II Dry Grass PVG

The perennial grasslands along the foothills of the Blue Mountains of northeastern Oregon and southeastern Washington have been subjected to severe overgrazing. In many grasslands, native bunchgrasses have been severely diminished and replaced by invasive annual grasses including cheatgrass, meadusahead, and ventenata. These exotic annual grasses can germinate in the fall with precipitation and develop root systems during the winter. They can then use much of the available soil moisture before perennial grasses initiate new growth in the spring. These annual grasses complete their life cycles in late spring to early summer, and the fine-textured cured foliage is highly flammable. This trait has expanded the historical burning season in some areas, which has only increased the dominance of the annual plants on these sites.

Bluebunch wheatgrass (*Pseudoroegneria spicata*) is a native, cool-season, perennial grass with tufted culms, 12-30 in. tall, erect or nearly so. Bluebunch wheatgrass has coarse stems and little leafy material, and therefore the tops burn quickly and little heat is transferred downward into the meristem tissue located near or in the soil. Bluebunch wheatgrass probably suffers the least amount of damage if burned while dormant and the most if burned while actively growing. Associates such as Sandberg's bluegrass (*Poa secunda*), and milkvetches (*Astragalus* spp.) are also favored by burning. Wyeth's buckwheat (*Eriogonum heracleoides* Nutt.), a late seral associate in bluebunch wheatgrass plant associations, is weakened by fire (https://fs.usda.gov/database/feis/plants/graminoid/psespi/all.html).

Idaho fescue (*Festuca idahoensis*) is a vigorous, native, long-lived, perennial, cool-season, bunchgrass. Plants are strongly caespitose. Leaves are fine, dense, and mostly basal, with sheaths remaining firm and entire. Culms are densely tufted in large bunches, with tuft 6 to 10 inches high, usually more than 1/2 the length of culms. Culms are erect, from 1 to 3.3 feet tall. Late-autumn fires are often less damaging to Idaho fescue than mid-to-late summer fires. Fires tend to burn within the accumulated fine needle-like culms at the base of the plant and produce temperatures sufficient to kill some of the basal meristematic tissue (https://fs.usda.gov/database/feis/plants/graminoid/fesida/all.html.) Associates such as balsamroot (*Balsamorhiza sagittata*), Kentucky bluegrass (*Poa pratensis*), and prairie junegrass (*Koeleria cristata*), appear to do well after a fire.

Cheatgrass/ Medusahead Rye Fire Regime IV Dry Grass PVG

Cheatgrass (*Bromus tectorum*) is a nonnative, typically winter annual grass. It can assume a spring annual character when fall moisture is limiting and seeds germinate in spring. Production of 2 successive sets of inflorescences in a single growing season is, however, fairly common. Cheatgrass has a finely divided, fibrous root system with an average of 7 main roots that grow rapidly, spreading laterally and vertically. Cheatgrass roots can penetrate 34 to 60 inches or more and are mostly concentrated in the top 12 inches. Plants 1st produce roots to depths of 7 to 8 inches (18-20 cm) before sending out far-reaching lateral roots. Cheatgrass reduced soil moisture to the "permanent wilting point" (about 4-8% soil moisture, dry weight basis) to a depth of 28 inches (70 cm) in natural stands. Cheatgrass roots are only thinly suberized (cell walls impregnated with suberin, a lipophilic macromolecule) as protection against loss of water to dry soil layers, which may explain why the plant senesces earlier in summer than bluebunch wheatgrass and medusahead.

Cheatgrass grows rapidly. Plants can mature with a single floret or with multiple tillers and florets. The amount of growth or tillering depends on the amount and timing of moisture received, and varies widely from year to year, with practically no production one year and tons per acre in other years. Cheatgrass maintains its dominance on many sites by adaptations that facilitate early and rapid growth, including a type of carbohydrate metabolism that permits growth at relatively low temperatures. Because cheatgrass can commence growth and deplete soil moisture before native plants break dormancy, it gains a competitive advantage in cold, semiarid environments. Cheatgrass also has greater top-growth yields per unit water used compared to summer-growing perennial grasses. Density of cheatgrass plants can range between 1 and 1,400 plants per square foot and averages around 600 plants per square foot. Cheatgrass often grows in pure stands.

Cheatgrass establishes from soil-stored and transported seed after fire. It has long been known that cheatgrass is highly adapted to a regime of frequent fires. Cheatgrass has a very fine structure, tends to accumulate litter, and dries completely in early summer, thus becoming a highly flammable, often continuous fuel. By the time of burning most cheatgrass seeds are already on the ground, and those not near the heat of burning shrubs can survive and allow cheatgrass to pioneer in the newly burned area. If fire kills green cheatgrass plants before they set seed, there may be enough viable cheatgrass seed in the upper layers of soil for plants to reestablish (https://fs.usda.gov/database/feis/plants/graminoid/brotec/all.html).

Medusahead (*Taeniatherum caput-medusae*) is a nonnative, cool-season annual grass. Plant height ranges from 8 to 20 inches depending on the site. Plants produce tillers, but very few leaves. The inflorescence contains 2 to 3 spikelets per node, and each spikelet contains 1 seed. Plants produce an average of 7.1 seeds per spike. Plants in dense stands usually produce 1 spike; in open areas the number of spikes per plant typically increases to 3 to 5. Medusahead dominated stands usually have more than 100 plants/ft^2.

Medusahead often dominates disturbed areas on soils with high moisture-holding capacities and slow percolation rates. In more mesic climates, moderately well-developed soils are as susceptible to invasion as well-developed soils. Conversely, soils with little profile development, particularly those that are well drained, remain dominated by cheatgrass in early seral stages regardless of whether they are in a more arid or mesic area. Medusahead and cheatgrass are often in competition with each other, and soil and topographic factors affect their distribution and relative dominance.

Medusahead germinates during autumn, late winter, or early spring. In mesic climates, it usually germinates in October and continues to grow through the winter. During winter, growth is slowed markedly with low temperatures, and the plant resumes active growth when the temperature increases at the beginning of spring. Leaves, stems and roots increase in number through the winter and roots can reach 40 inches depth by early February. This allows medusahead to outcompete desirable grasses such as bluebunch wheatgrass. Seeds are generally mature by late June to early July, a few weeks later than most annual grasses. Seeds remain in spikes until dispersal in late summer or early fall. Late maturity and greater availability of soil moisture late in the growing season allow medusahead to reach maturity and produce large amounts of seeds, which might enhance site occupation in subsequent generations

Medusahead has a fine structure and its herbage dries completely; therefore, its standing dead biomass is extremely flammable. As a result of its high silica content, medusahead litter decomposes more slowly than that of most plants making stands of this annual grass a fire hazard. The long-lasting litter formed by medusahead is easily ignited and burns readily. Invasion can initiate a cycle where a non-native grass colonizes an area and provides the fine fuel necessary for the initiation and propagation of fire. Fires then increase in frequency, area, and possibly severity. Non-native grasses recover more rapidly after fire than native species and cause a further increase in fire (https://fs.usda.gov/database/feis/plants/graminoid/taccap/all.html).

Wyoming Big Sagebrush Fire Regimes III and IV Warm Shrub PVG

Wyoming big sagebrush (*Artemisia tridentata ssp. wyomingensis*) is an aromatic, tall evergreen shrub. It occasionally reaches up to 79 inches but is typically shorter than 40 inches. Wyoming big sagebrush may be dwarfed as a result of edaphic conditions. It often grows on fine textured well drained soils. The main stem branches at or near ground level. Flower stems arise from vegetative stems. The crowns are rounded and uneven. They are typically dense and spreading, with the lower part of the crown often close to the ground. Dead stem wood is common in old plants. Wyoming big sagebrush develops a dense root network both in upper and lower soil layers. It has many laterals roots and one or more taproots. About 35% of the total root system occurs in the upper 1 foot of soil. Soil characteristics such as texture, aeration, and moisture influence root distribution of big sagebrush. Researchers have described the one-seeded fruit of Wyoming big sagebrush as an achene and a cypsela. The small seed ranges from about 0.04 inch long and 0.24 inch wide. Wyoming big sagebrush may produce abundant seed during years with above average precipitation, but seed production is often low. Common associates include bluebunch wheatgrass, Sandberg's bluegrass, arrowleaf balsamroot, milkvetch (*Astragalus spp.*) antelope bitterbrush (*Purshia tridentata*), rubber rabbitbrush (*Ericameria nauseosa*) and green rabbitbrush (*Chrysothamnus viscidiflorus*).

Wyoming big sagebrush plants are highly flammable and are easily killed by fire. Plants do not sprout post fire (https://www.fs.usda.gov/database/feis/plants/shrub/arttriw/all.html). Variation in fuels, topography and weather may result in fires that leave patches of unburned vegetation. Post fire seeding rates are typically low. Surviving plants in and adjacent to burns are seed sources for post fire establishment. Seed typically disperses within 10 feet of parent plant. Seedling establishment is episodic and occurs during wet periods. Wyoming big sagebrush is slow to recover to unburned canopy values.

Black Hawthorn Fire Regimes I and II Low Soil Moisture Cool Shrub PVG

Black hawthorn (*Crataegus douglasii*) is a large shrub or small tree ranging from 3.5 to 13.0 feet tall and possessing straight, strong thorns 0.5 to 1.0 inch long. Leaves are generally 1.5 to 2.5 inches long, broad, and serrated at the tip. Blackish, smooth fruits are about 0.5 inch long. Black hawthorn stems are usually clustered from the base or from a point just above the soil surface. Shade-killed lower limbs persist on the stem, creating large, dense thickets. The structural configuration of black hawthorn limbs makes it highly flammable due to the sheltering of dry grasses and twigs. These fuels may create a "ladder" for fire to be carried up to the crown, destroying the entire thicket. Both high- and low-severity fires will consume the aboveground parts of black hawthorn. Black hawthorn has a shallow and diffuse root structure that allows for sprouting and sucker-rooting following the destruction of aboveground parts. Common snowberry (*Symphoricarpos albus*) may be present where the upper canopy is fragmented. Grasses are virtually absent beneath the canopy. Perennial forbs that may be present include mountain sweetroot (*Osmorhiza chilensis*), stinging nettle (*Urtica dioica*), and longstalk starwort (*Stellaria longripes*) (https://www.fs.usda.gov/database/feis/plants/shrub/cradou/all.html).

Common Snowberry Fire Regimes I and II Cool Shrub PVG

Common snowberry (*Symphoricarpos albus*) is a native, deciduous, shrub that is densely branched. Plants vary in height from 3 to 4.5 feet. It has a rhizomatous growth habit with rhizomes 2 to 5 inches deep in mineral soil and commonly forms dense thickets. Flowers are borne in small clusters that produce white drupes. Each drupe contains 2 nutlets with 1 seed per nutlet. Associated Species include Idaho fescue and Kentucky bluegrass. Common snowberry is top killed by fire, but belowground parts are very resistant to fire. Variable response to fire has been reported. In general, light- to moderate-severity fires increase stem density and common snowberry survives even severe fires. To eliminate rhizomatous sprouting, fire intensity must be severe enough to kill the roots and rhizome system (https://www.fs.fed.us/database/feis/plants/shrub/symalb/all.html). After fire has killed the top of the plant, new growth sprouts from rhizomes. Rhizomatous growth response is highly variable and depends on conditions at specific sites. Regeneration from buried seed is favored by fires of low severity and short duration that remove little of the soil organic level.

Ponderosa Pine Regimes I and II Dry Upland Forest PVG

Ponderosa pine (*Pinus ponderosa*) is a fire dependent species, which requires frequent surface fires in order to maintain stand health. As a result, ponderosa pine communities have evolved properties that encourage recurrent, low intensity burning. Resinous pine needles provide an abundant yearly accumulation of highly flammable fuel. Fire frequencies for ponderosa pine under natural fire regimes vary greatly (Agee 1993).

Ponderosa pine has developed a number of fire adaptive traits which help minimize fire damage to tissues. Low intensity fires readily kill seedlings, but thick exfoliating bark and a deep rooting habit make larger trees quite tolerant of most ground fires. The potential for crown fires is reduced in mature individuals due to a tendency to self-prune lower branches, thereby spatially separating foliage from burning ground fuels. Propagation of flames into the crown is further discouraged by long needles that are loosely arranged within an open structured crown. In addition, the foliar moisture content is relatively high (28 to 36%). Trees subjected to dormant season burning are often able to survive crown scorch damage since buds are large and enclosed within thin, insulative bud scales.

Fire plays a crucial role in the regeneration of ponderosa pine by exposing bare mineral soil and removing competing vegetation. Although these conditions are considered optimal for the germination and establishment of ponderosa pine, postburn establishment is largely successful only when a good seed crop coincides with above average rainfall. Assuming the above conditions are met, seedbed continuity determines whether regeneration appears as dense stands, separated thickets or scattered individuals. Recurrent under burning acts to maintain a very open stocking of trees by reducing numbers of seedlings, removing dense understories of sapling or pole-sized stands, and thinning low vigor overstory trees.

The effect of fire on ponderosa pine is generally related to fire intensity, tree size, and tree density. Low intensity fires readily kill seedlings less than 12 inches in height. Larger ponderosa pine seedlings can sometime survive heat generated by low intensity surface fires due to their inherent ability to withstand high soil surface temperatures. Seedlings frequently escape surface fires by virtue of their establishment in areas where fuels are discontinuous. Ground fuel buildups in seedling stands are typically unable to carry fire until trees are 6 to 8 years old. Larger seedlings, saplings, and poles are only damaged by low intensity fires which generally act to thin regeneration stands of both low vigor trees and also shade tolerant species. Pine saplings are more fire resistant than comparatively aged Douglas-fir saplings due to such attributes as larger buds, thicker twigs, and the early development of an outer layer of corky bark. Although low intensity fires may leave pines 6 to 8 feet tall unharmed, prescribed burning is not usually recommended as a means of pre-commercially thinning regeneration stands, where trees are less than 10 to 12 feet in height. Beyond pole stage, ponderosa pine is quite resistant to the majority of ground fires.

Douglas-Fir Fire Regimes II, III and IV Dry and Moist Upland Forest PVG

Douglas-fir (*Pseudotsuga menziesii*) is more fire resistant than many of its associates and can survive moderately intense fires. Thick corky bark on the lower bole and roots protects the cambium from heat damage. Tall trees have their foliage concentrated on the upper bole which makes it difficult for fire to reach the crown. It should be noted that trees are typically not free of lower branches up to a height of 33 feet until they are more than 100 years old.

When trees are killed, Douglas-fir relies on wind dispersed seed from off-site trees to colonize the burned area. If catastrophic fires are extensive, a seed source may be limited due to the lack of seed trees. Under these circumstances, seeds come from mature trees that survive fire; survivors in small, unburned pockets; or from trees adjacent to the burned area. When fires do not kill all the trees in a stand, seedling establishment may begin within a year or two after burning. Mineral soils exposed by fire are generally considered favorable seedbeds.

Crown fires commonly kill trees over extensive areas. Hot ground fires that scorch tree crowns and char tree boles kill variable proportions of Douglas-fir. Rapidly spreading ground fires tend to inflict more damage to Douglas-fir crowns, while slow spreading ground fires are damaging to the bole and can kill trees through cambial heating. Crown scorching from summer fires is more damaging than fall fires because more buds are killed. During late summer, the buds are set and subsequent year needles are well protected. Seedlings and saplings are susceptible to, and may be killed by, even low-intensity fires.

Temperatures in excess of 140° F are lethal to Douglas-fir seeds. Most seeds on the forest floor will be destroyed by fire. Crown fires will kill seeds in green cones. However, green cones are relatively good insulators and are not highly flammable. Fires that are not excessively hot often only scorch the cones. Seeds can mature in scorched cones on fire killed trees and later disperse onto the burned area https://www.fs.usda.gov/database/feis/plants/tree/psemen/all.html .

Grand Fir Fire Regimes III and IV Moist and Cold Upland Forest PVG

Sapling and pole-sized grand fir (*Abies grandis*) have thin resinous bark that provides little insulation for the cambium and shallow roots that are susceptible to soil heating. Grand fir is slow to self-prune lower branches due to its shade tolerance. The low growing branches which have slender twigs and finely divided foliage easily ignite from burning undergrowth. Young grand fir is killed by low intensity surface fires.

At maturity, grand fir develops thick bark (2 inches) which provides some resistance to low and moderate intensity fires. Grand fir does not survive high intensity surface or crown fires. Its low, dense branching habit, flammable foliage, and tendency to develop dense stands with heavy lichen growth increase the likelihood of either individual tree torching and/or development of a crown fire (https://www.fs.usda.gov/database/feis/plants/tree/abigra/all.html).

Lodgepole Pine Fire Regimes III and IV Moist and Cold Upland Forest PVG

Lodgepole pine (*Pinus contorta*) bears both open and closed cones. This trait allows lodgepole pine to regenerate following both low and high intensity fire. Serotinous cones are advantageous for regeneration following high intensity fires because the heat opens the cones and then releases the seeds. Up to 10 years of annual seed production are stored in serotinous cones. This huge seed reserve blankets the exposed forest floor within three years after a fire and can explain heavy concentrations of seedling and sapling trees. Conversely, ground fires generate insufficient heat to open serotinous cones. Following this type of fire, seed for regeneration must come from surviving non-serotinous cones https://www.fs.usda.gov/database/feis/plants/tree/pincon/all.html.

Fire regimes in lodgepole pine dominated communities vary but in areas having dry summers, low to medium intensity ground fires occur at intervals of 25 to 50 years. In areas with moist summers, sparse understories and slow fuel build-up result in less frequent but more intense fires. Fires can smolder in duff for extended periods or can develop into rapidly spreading wildfires. Smoldering fires are common in lodgepole forests because understory fuels are sparse. Lodgepole pine stands become more flammable as they age because dead woody fuels accumulate on the forest floor.

Lodgepole pine is damaged more by ground fires than thicker-barked species such as ponderosa pine or Douglas-fir. Its thin bark has poor insulation properties that leads to cambium heating. As a result, many trees are killed but some trees do survive thinning stands.

Engelmann Spruce Fire Regimes 3 and 4 Moist Upland Forest PVG

Engelmann spruce (*Picea engelmannii*) is easily killed by fire due to: (1) its thin bark that provides little insulation for the cambium; (2) a moderate amount of resin in the bark which ignites readily; (3) shallow roots which are susceptible to soil heating; (4) low growing branches; (5) moderately flammable foliage; and (6) heavy lichen growth. Surface fires are often lethal because fine fuels are often concentrated under mature trees and burn slowly girdling the bole or charring shallow roots. Engelmann spruce is often restricted to cool moist sites restricting the period of time stands can burn (https://www.fs.usda.gov/database/feis/plants/tree/piceng/all.html).

2.10.3 Current Conditions Potential Vegetation Groups

Dry Grass PVG

The dominant native bunchgrasses have been replaced to a concerning extent by annual exotic annual grasses, exotic forbs and exotic seeded perennial grasses. Dry grasslands are very susceptible to the invasion of exotic plants because of excessive livestock grazing or other disturbance. The invasion of exotic annual grasses and subsequent increase in the extent and connectivity of highly flammable fuels leads to an altered fire regime which perpetuates the dominance of exotic annual grasses. However, fire intervals have lengthened due to fire suppression. Fire severity has not increased due to removal of fuels by the grazing of domestic livestock.

Dry Shrub PVG

Changes from the historical native plant communities' composition in shrub-steppe are most often associated with grazing, fire, or cultivation. The larger native perennial grasses are not well-adapted to withstand grazing. Heavy grazing tends, therefore, to eliminate bluebunch wheatgrass, Idaho fescue, Sandberg's bluegrass, Cussick's bluegrass (*Poa cusickii*), etc. and perennial forbs, and to increase annual grasses, particularly cheatgrass. Fire seriously affects non-sprouting shrubs such as basin big sagebrush (*Artemisia tridentata ssp. tridentata*), and antelope bitterbrush. The fire regime with dry shrublands is dominated by lethal fires. Areas experiencing frequent fire intervals often have a large component of exotic annual grasses that dry early in the season and become flashy fuels for fast-moving summer fires. Most perennial vegetation in the Dry Shrub PVG is not adapted to frequent high intensity fires. The result is mortality of perennial native species and prevention of their recruitment.

Low Soil Moisture Cool Shrub PVG

Daubenmire (1970) hypothesized that fire suppression allowed the current stands of black hawthorn to develop following a period of burning coincident to the early period of European settlement. He believed that stands of black hawthorn were natural although generalized descriptions of landscapes by land surveyors in the 1870's did not mention black hawthorn vegetation. Livestock readily eat hawthorn foliage that is within reach but access is limited by dense thickets of the shrubs.

Cool Shrub PVG

Species composition and structure of the cool shrub PVG has changed due to heavy continuous season long grazing, fire suppression, and introduction of invasive exotic grasses such as Kentucky bluegrass and seeded exotic grasses such as timothy (*Phleum pratense*). Large dominant native bunchgrasses such as Idaho fescue have been replaced by these species. During drought years, very intense fires have the potential to occur which can cause relatively severe effects to the soil surface and mortality of native grasses and forbs.

Dry Upland Forest PVG

Historical fire behavior was variable with short interval, low to moderate severity fire regimes. As a result of fire exclusion and the altered arrangements and amounts of fuel, these forests are now likely to burn with extreme fire behavior, with higher intensity surface fires and higher consumption of ground fuels. Lower and mid story stand density has increased leading to horizontal and vertical fuel increases. Excessive mortality of overstory trees and damage to soils are likely. Forests with low to moderate severity fire regimes experience more adverse ecological effects from high intensity and/or highly consumptive wildfires.

Moist and Cold Upland Forest PVG

An increase in tree density coupled with a shift to more shade tolerant species composition is visible in historical changes in the potential vegetation groups. The duration and intensity of insect outbreaks appears to have increased with the shift in species composition. Due to fire exclusion, wildland fires in this altered ecosystem are now of higher intensity and severity than historically would have occurred because stand density contributes greatly to vertical continuity and surface fuel buildup. Historically, fire created a complex mosaic of under burns, thinned stands with large residual trees, and stand replacement patches. A wildland fire will be able to grow rapidly in size as it propagates by spotting (embers ahead of main fire front). This PVG has missed fewer fires than the Dry Upland Forest PVG due to fire suppression since fires were historically infrequent.

2.10.4 Wildland Fire History

The CTUIR (2012) compiled data from the BIA Annual Forestry and Grazing Reports (1940-1971) and the Wildland Fire Management Information System (1972 to 2004) to determine fire chronology on the UIR. This fire chronology record was updated for the period 2005 through 2021 using the WFMI and Oregon Department of Forestry records. There were a total of 931 recorded wildland fires from 1940 through 2021 with approximately 54,243 acres burned (Figure 2-8). Of these 931 wildland fires 853 were human caused. Major contributors include train operation and track maintenance of the Union Pacific Railroad Company's main line, over-heating of vehicles and/or their brakes, harvesting of agricultural crops and removal of crop residue, and removal of debris around homesites. Only 78 lightning caused fires (8.3% of the total fires) were recorded during this period. The greatest number of acres burned was in 1962 at 22,961 acres. The Cayuse Fire started by equipment harvesting wheat that year.

In the recent past, aggressive fire suppression efforts have been effective in limiting growth of fires. From 2000-2018 five large fires occurred on rangelands and forestlands of the UIR. The Deadman's Pass Fire in 2000 resulted from off road vehicle use and burned 354 acres of grassland and forest stands. A Type 2 Interagency Management Team was needed to contain and suppress the fire. The Wildhorse Creek Fire in 2008 resulted from a lightning strike and burned 400 acres of grassland and forest stands. An Oregon Department of Forestry Incident Management Team was needed to contain and suppress the fire. The Weigh Station Fire in 2016 likely resulted from ATV use and burned 689 acres of grassland and forest stands. An Interagency Type 3 Incident Management Team was assigned to the fire. The Indian Lake Fire in 2017 resulted from a structure fire and burned 221 acres of grasslands and forest stands mostly off the UIR. The Cabbage Hill fire in 2018 resulted from an escaped prescribed fire and burned 129 acres of forest stands.

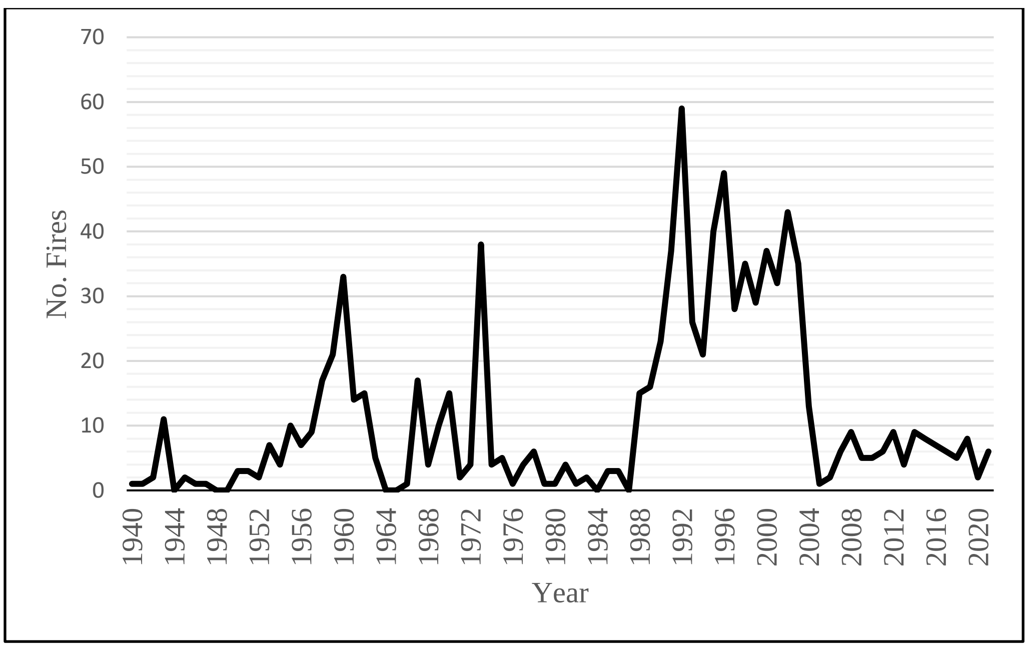

Figure 2-8. Fire Chronology on the UIR.

2.10.5 Prescribed Fire History

The BIA initiated use of prescribed fire as a resource management tool in 2001 burning 38 acres of annual grassland between the east and west bound lanes of Interstate I-84 to prepare a seedbed to establish perennial grasses. This burn was followed by a larger burn in 2003 to prepare a seedbed to reestablish perennial grasses on abandoned crop land along Hansell Road in the northeastern section of the UIR. The U.S Forest Service provided burn supervision and crews to supplement BIA crews for these fires since the BIA lacked qualified personnel for key positions as defined by the National Wildfire Coordinating Group. The BIA with additional qualified staff and funding secured under the National Fire Plan began to implement a more aggressive prescribed fire program beginning in 2017. Table 2-12 lists prescribed fire use from 2001 through 2021.

Table 2-12. Prescribed Fire Chronology on the UIR and Associated Lands.

Year	Treatment Name	Treatment Type	Acres
2001	I-84 Rx	Broadcast Burn Seedbed Preparation	38
2003	Hansell Rx	Broadcast Burn Seedbed Preparation	443
2005-2007	Indian Lake	Hand Pile Burn	56
2017	Wanaket Rx	Broadcast Burn Wildland Urban Interface (WUI)	165
2018	Nicely Rx	Broadcast Burn WUI Fuels Reduction	21
	Wanaket Canal Rx	Broadcast Burn WUI	20
	Cabbage Hill	Hand Pile Burn WUI	361
2019	Telephone Ridge Rx	Broadcast Burn WUI	200
	Wanaket Canal Rx	Broadcast Burn WUI	20
	Wanaket Beach Rx	Broadcast Burn WUI	183
2020	Wanaket Chain Rx	Broadcast Burn WUI	170
	Wanaket Canal Rx	Broadcast Burn WUI	30
2021	Emigrant Springs Slash Rx	Broadcast Burn WUI Fuels Reduction	150
	Wanaket Pile Burn	Hand Pile Burn WUI	100
	Wildhorse Pile Burn	Hand Pile Burn WUI	15
	Wanaket Canals Rx	Broadcast Burn WUI	4
	Burns Property Rx	Broadcast Burn WUI	267
	Doe Canyon Rx	Broadcast Burn WUI	253
	Forth Rx	Broadcast Burn WUI	452
	NFM Rx	Hand Pile Burn WUI	279
	Rainwater Rx	Hand Pile Burn WUI	15
	Stage Gulch Rx	Broadcast Burn WUI	1,730

2.11 Transportation System

Many roads in the range and forest area of the UIR were established as a result of historical use by Tribal members and other individuals. Surfaces are unimproved with inadequate drainage to prevent soil loss. Deep ruts are common during wet conditions allowing use only by vehicles with high clearances and four-wheel drive. These low standard roads provide operational access for land management plus Tribal member access for subsistence and recreational uses.

Many roads follow topographic features such as ridges and streams. Only a few roads were developed to standards in existence at the time they were constructed. During the last 60 years, the BIA and CTUIR have rarely performed maintenance on these roads due to a lack of funds. Several roads constructed for timber harvest activities and located in riparian areas along major streams (Isqúulktpe, Buckaroo, Little Johnson, and McKay Creeks) are no longer usable. Reconstruction of these roads to an acceptable standard would be prohibitive due to costs and environmental concerns.

Roads alter natural sediment and hydrologic regimes by changing streamflow patterns and amounts, sediment loading, transport, and deposition, channel morphology and stability. Extremely large amounts of sediment can enter streams from mass wasting of road fill material, concentration of surface runoff due to improper alignment and/or grade, concentration of runoff in ruts created by vehicle use on unimproved road surfaces, and destabilization of streambanks due to improper location of the roads.

The CTUIR have compiled an inventory of roads on the UIR (Table 2-13). The inventory includes roads outside the range and forest area of the UIR. In addition, the inventory may not include all trails and unimproved roads that could be present on the landscape, especially in rangelands, and are accessible by four-wheel drive vehicles and all-terrain vehicles (ATV) at least for part of the year. The CTUIR have approved Travel and Access Management Plans for the Wanaket and Rainwater WMA's. Areas. However, the CTUIR has not completed a Travel and Access Management Plan for the range and forest areas of the UIR.

Table 2-13. Miles and Density of Roads by Road Type on the UIR.				
HUC 10 Watershed	Road Type	Road Miles	Area Square Miles	Road Density Per Square Mile
Birch Creek	Local Road Rock/Dirt	2.77	0.28	9.89
	Unimproved Road	1.66		5.92
	Total	4.43	0.28	15.82
McKay Creek	Local Road Rock/Dirt	21.15	46.11	0.46
	Paved Hard Surface	0.09		0.00
	Trail	3.45		0.07
	Unimproved Road	113.32		2.46
	Total	138.01	46.11	2.99
Meacham Creek	Local Road Rock/Dirt	0.13	8.29	0.02
	Railroad	4.09		0.49
	Trail	8.60		1.04
	Unimproved Road	21.01		2.53
	Total	33.83	8.29	4.08
Meadow Creek	Local Road Rock/Dirt	2.44	6.73	0.36
	Unimproved Road	28.79		4.28
	Total	31.23	6.73	3.31
Umatilla River/ Mission Creek	Paved Highway	39.46	161.41	0.24
	Local Road Rock/Dirt	118.97		0.74
	Paved Hard Surface	21.49		0.13
	Railroad	27.96		0.17
	Trail	25.14		0.16
	Unimproved Road	169.65		1.05
	Total	402.67	161.41	2.49
Upper Umatilla River	Local Road Rock/Dirt	2.49	5.14	0.49
	Trail	1.01		0.20
	Unimproved Road	9.83		1.91
	Total	13.33	5.14	2.59
Wildhorse Creek	Paved Highway	1.16	46.33	0.03
	Local Road Rock/Dirt	70.91		1.53
	Paved Hard Surface	0.81		0.02
	Unimproved Road	30.74		0.66
	Total	103.62		2.24
Grand Total		727.12	161.41	4.50

Tetra Tech Inc. (2021) used the Geomorphic Roads Analysis and Inventory Package (GRAIP) Lite to estimate sediment delivery to streams of the Umatilla Subbasin. GRAIP Lite uses a topographic model along with road maintenance and status, to create road segments, apply average vegetation parameters, and calculate sediment production from individual road segments. Fine sediment production for a road segment is estimated with a base erosion rate and the properties of the road. Tetra Tech used a base rate of 1.5 kg/year/m. The sediment volume produced by road segments would proportionally change with any changes in the base rate. GRAIP Lite then determines stream connection probabilities and sediment delivery based on flow distance to streams.

Table 2-14 presents the results of the GRAIP analysis by fifth level watershed (Hydrologic Unit Code (HUC) 10) for the UIR. The CTUIR has not completed GRAIP Lite analysis for the Wanaket and Rainwater WMA's as well as the McCoy Meadows Ranch. A HUC 10 watershed typically ranges in size from 40,000 to 250,000 acres. These HUC 10 watersheds include lands outside the area to be covered by the Range Management Plan.

Table 2-14. GRAIP Lite Model Results by Watershed.

HUC 10 Watershed	GRAIP Lite Road Miles	Low Sediment Delivery 0-0.001 Tons/Year	Moderate Sediment Delivery 0.001-0.01 Tons/Year	High Sediment Delivery 0.01+ Tons/Year
Meacham Creek	393	350	40	1
Mission Creek Umatilla River	603	527	62	15
McKay Creek	518	454	53	11

2.12 Livestock as a Vegetation Management Tool (Targeted Grazing)

Targeted grazing refers to the application of a specific kind of livestock at a determined season, duration, and intensity to accomplish defined vegetation or landscape goals (American Sheep Industry 2006). Targeted grazing for invasive weed management aims to give desirable vegetation a competitive advantage over invasive weeds. While targeted grazing may not eradicate invasive weeds, it can be an effective weed management tool if timed correctly. The season and duration of grazing should be timed to remove seed-producing structures before viable seeds are produced. Grazing must also be seasonally timed for when the targeted invasive weeds are most palatable to livestock and to minimize effects on desirable vegetation. To improve competition with invasive weeds, desirable vegetation must have adequate time to recover between grazing periods.

Sheep, goats, and cattle can be used for targeted grazing. Sheep and goats will preferentially eat broadleaf plants, while cattle will preferentially graze grasses. Sheep and goats have been used to control several species of invasive weeds in the Northwest, including leafy spurge, yellow starthistle, and Russian knapweed. Goats can be used to remove dead weed litter and seed from fence lines and other areas to minimize weed spread. Cattle grazing early in the season prior to seed set can help limit the spread of invasive annual grasses. After grazing weed seed, livestock should be fed other forage for four or five days before moving to other pastures. This time period prevents the possibility of spreading weeds carried in livestock digestive systems. The CTUIR have used goats for targeted grazing on yellow starthistle in the Meacham Creek drainage and on the Rainwater WMA.

Mosley and Roselle (2006) itemized 10 key points for consideration when using targeted grazing to suppress annual grasses:

- Targeted livestock grazing can suppress annual grasses where these grasses are considered weedy invaders.
- Invasive annual grasses have a self-perpetuating relationship with fire.
- Targeted grazing can be used to disrupt fine fuel continuity and reduce fuel loads.
- Annual invasive grasses can be suppressed when livestock grazing reduces the production of viable seeds.
- Seedheads of invasive grasses must be removed while the grasses are still green.
- It may be necessary to graze annual grasses two or three times in the spring.
- In mixed stands of annual grasses and perennial plants, livestock must be observed closely to avoid heavy grazing of desirable perennial plants.
- Livestock perform well on annual grasses in the spring producing satisfactory weight gains.
- Targeted grazing can be integrated with prescribed fire and mechanical treatments.
- Applying targeted grazing before artificial seeding of desirable plants can assist restoration efforts.

Similar to other weed treatment methods, targeted grazing is often more effective when used in combination with other treatments. For example, targeted grazing that results in removal of weed litter or thatch can increase the effectiveness of follow-up herbicide treatment.

2.13 Livestock Grazing as an Economic Development Opportunity and as a Means to Generate Income for Landowners

2.13.1 Available Forage

Synergy Resource Solutions Inc. (2009) found that stocking rates calculated strictly from the similarity index failed to reflect conditions on the UIR. Data analysis showed several reasons for the under estimation of proper stocking rates:

- No published ESD's existed for forest or riparian sites. Therefore, it was not possible to calculate and use SI to calculate stocking rates for 14 forest and 2 riparian sites.

- Upper limits for desirable and palatable species were lower in the ESD's than found on site causing the stocking rates to be underestimated.

- A few native grass species such as Thurber's needlegrass (*Achinatherum thurberianum*) and blue wildrye (*Elymus glaucus*) are palatable, produce considerable forage, and are ecologically desirable. Because these species are not included in the reference potential natural community in the ESD, their contribution to forage production is ignored in calculation of the stocking rates.

- Introduced species such as tall oatgrass (*Arrhenatherum elatus*), intermediate wheatgrass (*Agropyron intermedium*), orchardgrass (*Dactylis glomerata*), and smooth brome (*Bromus inermis*) are not included in the ESD's reference plant communities Therefore, forage production from these species is ignored and the stocking rates underestimated.

- Because only one species from a genus was included in the reference plant community in ESDs for most sites, strictly applying the SI ignored other species in the same genus that serve the same ecological role. This was particularly true for bluegrasses resulting in under estimation of stocking rates.

- Two ecological sites, Shrubby North and Shrubby Moist North, allowed over 3,000 pounds per acre for unpalatable shrub species, overestimating the stocking rates.

Synergy Resource Solutions Inc. used a Modified SI to better reflect the appropriate stocking rate for the UIR (Table 2-15). Calculations were modified as follows to better reflect actual conditions on the ground.

- Production from forest and riparian sites was included in calculation of stocking rates.

- Production from native species in excess of the amount listed for the ESD reference plant community was included in calculation of the stocking rates.

- All production from desirable and palatable native species not listed in the ESD reference plant community was included in calculation of the stocking rates.

- Production from palatable introduced species was included in calculation of the stocking rates.

- Production from all species in a genus comprised of native plants was included in calculation of the stocking rates.

- At least a portion of the production of annual species was included in calculation of the stocking rates.

Synergy Resource Solutions Inc. rated all species found based on palatability to cattle. Categories included high, medium, or low. Synergy Resource Solutions Inc. considered palatability and likelihood of use to be similar. The calculations for the modified SI allowed 100% of production for highly palatable species, 50% of production for medium palatable species and 0% of production for low palatable species. Using this procedure creates a method for arriving at conclusions that matched field observations.

Synergy Resource Solutions Inc. further adjusted initial stocking rates based on slope, distance to water, and harvest efficiency. As slope increases, utilization by cattle decreases. As distance to water increases, cattle use of forage decreases. Stocking rates were adjusted according to guidelines in the National Range and Forage Handbook (NRCS 2003). The National Forage and Range Handbook further recommends the use of 25% harvest efficiency in stocking rate calculations. Forest sites produce palatable vegetation that is often inaccessible to cattle due to downed timber, dense shrubs, or other factors. Therefore, harvest efficiency ranges for forest sites from 0-25%.

DJ&A P.C. (2021) did not use the same procedure as Synergy Resource Solutions Inc. in calculating available AUM's (Table 2-16). DJ&A P.C. did not calculate a Modified SI. Therefore, the adjusted AUMs are meant to describe all available forage as determined by the reconstructed dry weight of all plant species. Synergy Resource Solutions Inc. used forage production as determined by the Modified SI to calculate available AUM's not total forage production. As previously discussed, there were major differences in precipitation levels during the growing seasons in 2009 and 2021 that resulted in lower total forage production in 2021. The firm also used slightly lower adjustment factors for slope and distance to water. They also did not include harvest efficiency in their calculations. Considering the differences in approach between the two inventories in calculation of available Animal Unit Months (AUM) and the differences in weather from 2009 to 2021, it seems reasonable to conclude that the approach favored by Synergy Resource Solutions Inc. is the most appropriate to determine initial stocking rates. These figures represent the forage available for the potential for tribal members and/or CTUIR owned entities to develop livestock enterprises as well as generate income for landowners.

The advertisement for the sale of grazing privileges on range units of the UIR for the period 2017 through 2021 provided for members of the CTUIR to exercise the privilege of meeting the high bid of any non- member. However, there were no members of the CTUIR who exercised this privilege to hold grazing permits. Prior to 2017, there were members of the CTUIR who acquired grazing permits for range units on the UIR.

Table 2-15. Modified Calculated Stocking Rates for Eleven Range Units on the UIR Based on the 2009 Inventory.							
Range Unit	Acres	AUMs from Total Dry Weight	AUMs from Similarity Index	AUMs from Modified Similarity Index	Adjustment Factor for Slope and Distance to Water	Harvest Efficiency	Calculated Stocking Rate in AUMs
3	20,403	34,323	5,867	13,284	0.48	0.25	1,660
5	5,117	13,789	596	5,042	0.71	0.25	1,027
6	11,127	19,575	3,405	10,698	0.64	0.25	1,744
8	4,777	11,625	2,392	5,745	0.65	0.25	980
9	2,399	6.024	986	3,026	0.66	0.25	479
10	1,995	3,633	932	2,070	0.69	0.25	344
11	1,913	4,036	1,001	2,634	0.54	0.25	335
12	4,141	6,151	1,833	4,015	0.56	0.25	557
14	1,903	2,123	20	701	0.96	0.25	166
15	9,059	9,820	562	4,840	0.67	0.25	984
16	3,523	4,070	482	2.028	0.71	0.25	376
Total	66,356	115,187	18,076	54,082	0.61	0.25	8,651

During the grazing permit period 2017-2021, the BIA collected approximately $84,217.00 each year in grazing fees for grazing privileges on trust lands to distribute to the beneficial owners including both individual Indians and the CTUIR. In addition, the CTUIR collected approximately $6,051.00 for grazing privileges on tribal owned fee patent lands (Table 2-17).

Table 2-16. Adjusted AUMs for 15 Range Units on the UIR and Associated Lands Based on the 2021 Inventory.					
Range Unit	Acres	AUMs from Total Dry Weight	AUMs Derived from Similarity Index	Adjustment Factor for Slope and Distance to Water	Adjusted AUMs
1	4,933	8,435	430	0.54	4,568
3	20,402	29,363	1,473	0.44	13,045
5	4,845	6,800	141	0.68	4,636
6	11,237	25,467	1,314	0.62	15,745
7	523	1,156	171	0.99	1,147
8	4,686	12,437	489	0.63	7,796
9	2,113	5,222	257	0.62	3,261
10	1,884	6,012	142	0.65	3,900
11	1,884	6,765	243	0.49	3,321
12	4,786	8,148	518	0.52	4,205
14	1,905	1,309	2	0.94	1,232
15	9,161	9,550	415	0.64	6,181
16	3,536	3,947	181	0.68	2,666
17	2,609	6,559	484	0.93	6,113
20	1,918	2,120	58	0.64	1,351
Total	76,422	133,297	6,325	NA	79,174

Table 2-17. Income Per Year 2017-2021 for Grazing Privileges on Range Units of the UIR					
Range Unit	Permit AUMs	Allotted & Tribal Trust Grazing Fees	Tribal Fee On-Off Grazing Fees	Administrative Fee	Infrastructure Maintenance Fees
3	674	$ 11,443.72		$ 155.00	$ 337.00
5	629	$ 5,898.01	$ 4,955.24	$ 100.00	$ 315.00
6	1052	$ 20,475.11	$ 6,087.89	$ 245.00	$ 526.00
7	238	$ 3,894.00		$ 80.00	$ 119.00
8	820	$ 10,034.82	$ 3,905.18	$ 145.00	$ 410.00
9	150	$ 2,196.80	$ 203.02	$ 65.00	$ 75.00
10	122	$ 2,130.95		$ 65.00	$ 61.00
11	196	$ 3,136.00		$ 75.00	$ 98.00
12	454	$ 4,233.88	$ 3,264.90	$ 85.00	$ 227.00
14	127	$ 1,995.29	$ 44.71	$ 60.00	$ 63.50
15	657	$ 7,778.85	$ 2,741.15	$ 120.00	$ 328.50
16	340	$ 8,000.00		$ 125.00	$ 170.00
20	177	$ 2,999.66		$ 70.00	$ 88.50
Total	5636	$ 84,217.09	$ 21,562.09	$ 1,390.00	$ 2,818.50

CHAPTER 3 – RANGE MANAGEMENT DIRECTION

3.1 Management Strategy Development

The IDT used a three-step process to identify a reasonable range of alternatives that respond to the issues and concerns. The IDT first established goals and objectives for the management of range resources on the UIR. Then, the IDT identified standards or the physical biological, and social conditions necessary for any alternative to meet the goals and objectives. Finally, the IDT formulated the management direction based on the following principles and the state-and transition model of vegetation dynamics that reasonably could be expected to meet the goals and objectives if fully funded and implemented.

- Any management program must utilize the best methods available to manage range resources depending on their ecological status, geographic location, presence of or the need to restore traditional plants or animals, fish and wildlife habitat requirements, watershed values, and legal, policy, and budget constraints.

- Any management program must follow established procedures for analysis of range resources including determination of ecological status and monitoring that will document successes and failures.

- The management program should provide for economic sustainability consistent with the *First Foods* Mission of protecting rangeland ecosystems for the perpetual cultural, economic and sovereign benefit of the CTUIR.

- The management program must include a process whereby it can be modified in response to changing range ecosystem conditions as identified by the monitoring process.

Natural resource management professionals divide rangelands into ecological sites for the purposes of inventory, evaluation, and management. An ecological site is a distinctive kind of land with specific physical characteristics that differ from other kinds of land in the ability to produce a distinctive kind and amount of vegetation and in its response to management. An ecological site is the product of all the environmental factors responsible for its development and has key characteristics, i.e., soils, hydrology, vegetation, that are included in the ecological site description. The natural plant community on an ecological site has a specific species composition that differs from that of other ecological sites in the proportion of each species and in annual production in the absence of disturbance.

The state and transition model of vegetation dynamics can help explain rangeland ecosystem change when (1) the system can evolve in several ways rather than follow a single pathway; (2) the change occurs very rapidly; (3) changes are near permanent; and (4) detailed explanations of the processes that cause plant communities to change from one to another are required. These different plant communities are called states and the processes that cause states to change from one to another are called transitions. A state can be defined as a recognizable complex consisting of the soil base and vegetation structure components. Transitions can be defined as the trajectories of system change away from the current stable state precipitated by natural events, management actions, or both (Stringham et al. 2003).

When states are resistant to change, they are called stable states. A stable state can occur when long-lived or otherwise dominant plants occur on a site. These stable state plant communities change only as a result of transitions such as periods of above-average moisture or drought, fire, or management actions. The site factors that impose this high level of stability on a site are called "thresholds". Thresholds are points in time and space at which one or more of the primary ecological processes responsible for maintaining the sustained equilibrium of the state has been irreversibly changed and must be actively restored before a return to the previous state is possible. Examples of thresholds include:

- Soil erosion and nutrient loss so severe that some plants cannot grow.
- Invasion of a site by a plant that is so dominant that other plants cannot compete.
- Change in the water cycle, such as more rapid runoff because of a lower rate of infiltration into the soil, to the point that plant growth is restricted during part of the growing season.
- Change in plant community structure--arrangement of plants on the site--so that fire, a naturally occurring event that directs ecosystem change, cannot occur or occurs in a more destructive way.

Figure 3-1 (https://edit.jornada.nmsu.edu/) represents a general state and transition model for cool season bunchgrass rangelands. The landscape uninfluenced by disturbance should exhibit a mosaic of rather well-defined plant communities that are relatively simple in their floristic composition. As disturbance begins the distinctiveness of floras among the ecosystems declines and floristic complexity increases. Among the invaders are exotic plants that can utilize the site. Native plants are typically not adapted to compete with these exotic invaders.

Averett et al. (2020) concluded that shifts from native bunchgrass to non-native annual grass dominance is generally associated with suppressed native species richness and abundance. Non-native annual grass invasion is negatively associated with native forb abundance. A stable state plant community results and changes only as a result of natural events such as an extended period of above average moisture or drought and/or management actions. DJ&A, P.C. (2021) conducted an inventory of rangelands for the CTUIR and determined sites sampled are predominately in Disturbance State 3 in relation to the historic climax plant community description for the ecological site. The sites are likely to remain in this state, below the threshold for return to a natural plant community, if no active management or natural disturbances take place.

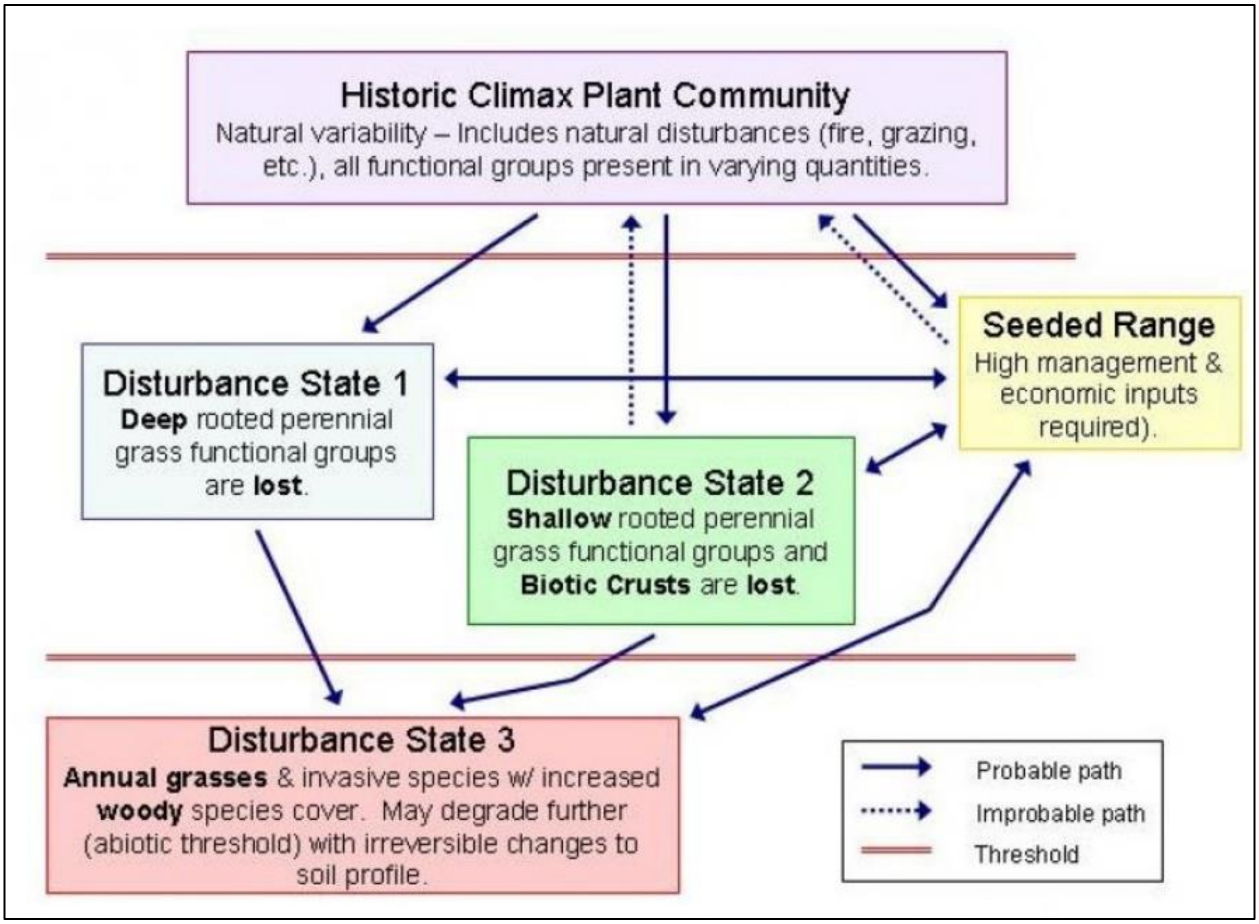

Figure 3-1. General State and Transition Model for Cool Season Bunchgrass Rangelands.

3.2 Goals, Objectives, and Standards

Standards (S) are the physical, biological, and social conditions necessary to meet the goals and objectives of the Range Management Plan. Standards are acceptable levels of quality or attainment and are mandatory. Standards are to be monitored at appropriate intervals. If standards are not being met for water quality/instream and riparian conditions and upland plant community composition, management must be changed to provide for an improving trend. Guidelines (G) are strongly encouraged recommendations for the implementation of a practice. Standards are indicated by *shall* terminology and guidelines are indicated by *should* terminology.

3.2.1 First Foods

Goals

1) Identify management and monitoring efforts to maintain/enhance 1) Soil Stability, 2) Hydrologic Functions, 3) Landscape Pattern, and 4) Biotic Integrity.

2) Develop management projects and programs that contribute to increased production of and enhanced access to traditional foods and medicines.

Objectives

1) Protect, restore, and enhance traditional foods and medicines for perpetual cultural, economic and sovereign benefits.

2) Inventory and monitor the extent of culturally significant medicinal plants, roots and berries (First Foods) over time to determine trends in abundance and distribution.

3) Identify locations for fence stiles, cattleguards and/or gates required to improve access to traditional foods and medicines for tribal members especially elders.

Standards and Guidelines

S1 Surveys for the presence and abundance of *First Foods* species of particular importance *shall* be completed prior to any ground disturbing activities.

S2 Management activities *shall* maintain, enhance and/or restore plant communities that support First Foods.

G1 Research on best management techniques to restore native plant communities *should* be promoted and incorporated in management activities.

3.2.2 Water Quality/ Instream and Riparian Ecosystems

Goals

1) Maintain or restore the chemical, physical, and biological conditions as well as the cultural integrity of surface waters.

2) Protect and restore watersheds, riparian zones, and wetlands to improve stream flow to meet in-stream flow needs.

Objectives

1) Moderate both summer and winter stream temperatures throughout all watersheds.

2) Manage riparian areas for multi-storied plant communities that promote bank and channel stability, provide resiliency to disturbance, and generate aquatic diversity.

3) Manage for channel and substrate conditions that will not limit spawning and rearing of native fish.

4) Provide for natural channel forming and maintenance processes that will continue to operate without substantial long-term modifications.

Standards and Guidelines

S3 Management activities *shall* support a stable floodplain and channel condition or promote floodplain development at an elevation that is accessible to streamflow during high flow events. A stable condition is defined through channel morphology measures of channel dimension, pattern, and profile that are repeatable and can be used in trend analysis. A stable floodplain and channel efficiently route sediment without aggrading or degrading and maintains consistent channel features through time.

S4 Management activities *shall* provide rangelands and grazable woodlands support or are making measurable progress toward supporting the appropriate riparian plant community for the site as determined by plant composition and ground cover.

S5 Management activities and use *shall* restore and protect all active floodplains, riparian areas, and wetlands.

a. For active floodplains, riparian areas, and wetlands with shrubs, including areas having the potential for shrubs, or where shrubs have been removed in the past, management activities should achieve 80% coverage of each bank with at least 50% of that cover at full height typical for the shrub species involved.

b. For riparian areas that cannot support shrub dominated vegetation (e.g., too rocky or too thin soils), management activities must provide these sites support or are making progress as measured by plant composition and ground cover toward supporting riparian plant communities typical to the site.

S6 Rangeland management practices *shall* be planned and implemented to meet CTUIR water quality standards. In stream reaches where water quality does not meet CTUIR standards, rangeland management activities including restoration practices will be implemented to promote measurable improvements. Select water quality standards that have a high potential to be negatively impacted by rangeland management activities are described below.

a. The highest seven day moving average of daily maximum stream temperatures shall not exceed 50^{o} F in bull trout habitat, 55^{o} F in salmonid spawning habitat, and 64^{o} F in salmonid rearing habitat.

b. A maximum of 20% of the stream substrate surface in expected spawning areas (as determined by CTUIR Fisheries Program) should be covered by fine sediments (diam. ≤o.25 in.).

c. Turbidity shall not be at a level to potentially impair designated beneficial uses or aquatic biota. More than a 10% cumulative increase in natural stream turbidities as measured relative to a control point immediately upstream of any or all turbidity causing activities will not be allowed.

3.2.3 Threatened, Endangered, and Candidate Fish and Wildlife Species Listed

Goals

1) Protect threatened and endangered species and their habitats.

2) Contribute to range-wide recovery of threatened and endangered species.

Objectives

1) Ensure all management actions consider impacts to threatened and endangered species.

2) Identify opportunities to improve habitat critical to threatened and endangered species.

Standards and Guidelines

S7 The legal and biological requirements for the conservation of federally listed endangered, threatened, and candidate plants and animals *shall* be met.

S8 A biological assessment according to the requirements of the ESA as amended when an action may or will affect a listed species *shall* be prepared. Meet consultation requirements of the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) for these actions.

3.2.4 Wildlife/Wildlife Habitat

Goals

1) Maintain high quality deer and elk summer, transitional, and winter range habitat conditions including high quality cover, forage water resources, (springs, seeps, streams) and security habitats to provide viable, harvestable and sustainable populations.

2) Ensure adequate distribution of well-connected, persistent high-quality habitat representing different plant community types and structural stages for a variety of native wildlife species.

3) Identify methods to estimate year-long resident as well as wintering deer and elk populations necessary to allocate forage between wild ungulates and domestic livestock.

4) Design range improvements that minimize adverse impacts to wildlife.

5) Resolve wolf predation of livestock consistent with the CTUIR Wolf Policy (CTUIR 2018a).

6) Design and implement an effective monitoring program to detect presence of bighorn sheep in areas where contact could occur between domestic sheep or goats and bighorn sheep.

Objectives

1) Maintain the quantity and arrangement of cover and forage areas to maximize use by deer and elk.

2) Provide and maintain big game security habitat (areas more than one-half mile from an open motorized route and greater than 250 acres in size).

3) Represent a diverse range of plant community successional and structural stages.

4) Protect special and unique habitats such as geomorphic features.

5) Construct required range improvements (fences, spring developments) that meet interagency standards for ease of access by wildlife.

6) Identify and remove fences or other range improvements no longer required for livestock grazing.

7) Advise and assist livestock operators with implementing BMPs to reduce predation of livestock by wolves and other carnivores.

8) Only authorize domestic sheep or goat grazing including vegetation manipulation for invasive plant control or fuels reduction, where effective separation from bighorn sheep can be ensured.

Standards and Guidelines

S9 All range fences *shall* be installed utilizing wildlife friendly specifications. Typical barbed or smooth wire fences shall have a minimum bottom wire height of 18″ above ground level and a maximum top wire height of 42″.

S10 Vestigial fences *shall* be removed as part of new fence construction.

S11 Redundant fences or fences no longer required for livestock grazing *shall* be removed.

S12 All existing or new water troughs *shall* be fixed with wildlife exit structures.

S13 Livestock *shall* be excluded by fencing from any aspen stand not meeting regeneration standards as measured by the number of suckers' ≤ 6 ft. in height.

S14 A comprehensive array of Best Management Practices (BMPs) to reduce predator-livestock conflicts and minimize the need for control actions on depredating carnivores *shall* be developed and implemented.

S15 Grazing by domestic sheep or goats *shall* not be authorized nor allowed on lands where effective separation from bighorn sheep cannot be ensured.

S16 An effective monitoring program *shall* be in place to detect presence of bighorn sheep where grazing by domestic sheep or goats has been authorized.

G2 Passage structures and laydown fences *should* be used in areas of know wildlife travel, migration, or other high use areas.

G3 On a subwatershed basis, total area of big game security habitat should exceed 30%'.

3.2.5 Upland Plant Community Composition/Invasive Plants

Goals:

1) Manage all grasslands, forests and associated riparian areas to provide for healthy functional ecosystems and reduce the risk of noxious weed infestation.

2) Align grazing objectives with native plant phenological changes to minimize harm to perennial grasses.

Objectives:

1) Manage plant communities in a way that will favor the increase of native perennial vegetation.

2) Maintain and/or increase ecological condition (Similarity Index (SI)) throughout CTUIR rangelands.

3) Use all possible BMPs outlined in the CTUIR Integrated Weed Management Plan (IWMP) to control non-native vegetation.

4) Maintain and/or increase the temporal and spatial distribution of higher forage ratings.

5) Increase the structural and compositional diversity of grazeable woodland.

Standards and Guidelines

S17 Management activities *shall* insure that rangelands and grazable woodlands support or are making measurable progress, as determined by plant composition and ground cover, toward supporting the appropriate upland plant community for the site.

S18 Planting of native grasses, forbs, shrubs, and trees in in degraded rangelands, and grazable woodlands *shall* be implemented if:

a. Natural regeneration of native plants will not establish sufficient cover.

b. The vegetation that will establish or has established on a site is not the desired plant community.

c. Certain plant communities are required to meet land use goals and objectives.

S19 Use of native plant materials *shall* be prioritized for restoration of native ecosystems.

S20 Seed preference for any revegetation operation *shall* be prioritized as follows:

a. Locally adapted native seed sources will generally and necessarily be used in projects to reestablish native plant communities when any remnant native plants are not likely to increase in abundance and cover.

b. Native cultivars may be used in the absence of adequate true native seed sources when environmental thresholds for native perennial plants have been passed, or when threats of noxious weed infestations or accelerated soil erosion are immediate and cannot be adequately addressed in a timely manner with true native seeds.

c. Non-invasive introduced species may be used for control of invasive plants or where immediate and unpredictable erosion threats exist. Such introduced species must be non-persistent and not permanently displace native species.

S21 The increase and spread of invasive plants *shall* to the extent possible be minimized by using all possible BMPs outlined in the CTUIR IWMP.

G4 In general, range seeding *should* be completed immediately prior to the period of longest favorable growing conditions. A favorable growing period of 40 to 60 days will increase the success rate for establishment of stand. In areas where snowpack can be expected to last through the winter, fall seeding just prior to snowfall is recommended.

3.2.6 Climate Change

Goals

1) Utilize rangelands and grazable woodlands as a carbon sink.

2) Gain an improved understanding of key soil microorganisms and the role they play in local soil carbon accumulation and storage.

3) Compile an inventory of resilience building BMPs for increasing soil carbon and water infiltration.

Objectives

1) Perform soil testing to determine baseline carbon levels and identify areas for increased potential.

2) Increase understanding and active support of soil microorganisms involved in carbon mineralization processes in rangelands.

3) Provide guidance to increase soil organic matter across the landscape incorporating BMP's that can be used in future carbon crediting schemes.

Standards and Guidelines

S22 Management practices *shall* promote increased soil organic matter.

S23 Management practices *shall* be beneficial to soil carbon levels and soil microorganisms.

G5 Adaptive management strategies should be emphasized as needed for addressing changes to native plant communities resulting from climate change.

3.2.7 Livestock Grazing as a Vegetation Management Tool

Goals

1) Utilize herbivory as a management tool to manipulate vegetation composition and structure.

2) Manage feral horse populations to reduce impacts to plant community composition and structure and damage to rangeland infrastructure.

Objectives

1) Allocate available forage quantity between wild ungulates, feral horses and permitted livestock.

2) Design and implement livestock grazing systems that promote development of native plant communities.

3) Time grazing strategies to reduce or eliminate competition with traditional food gathering activities.

4) Maintain range unit infrastructure to enhance permitted livestock control, facilitate tribal member access and reduce habitat fragmentation.

5) Maintain between 50 and 125 feral horses on CTUIR rangelands consistent with the CTUIR Feral Horse Policy.

Standards and Guidelines

S24 Clean, plentiful water *shall* be available on site or near enough to be hauled or for the animals to be trailed to it.

S25 Target plants (invasive plants) *shall* be acceptable as forage.

S26 Grazing *shall* be timed to inflict damage during a vulnerable time of the target plants life cycle to reduce its presence and/or vigor.

S27 Livestock *shall* be controlled to minimize damage to non-target species and other ecosystem components.

G6 Grazing intensity on invasive annual grasses *should* be high enough (residual stubble height 2-3 inches) to limit production of viable seeds in order to suppress annual grasses. Grazing must occur during periods of active growth and before seeds reach the dough stage.

3.2.8 Livestock Grazing as an Economic Development Opportunity and as a Means to Generate Income for Landowners

Goals

1) Provide the opportunity for tribal members to exercise their treaty right to graze livestock on CTUIR rangelands.

2) Provide income to tribal landowners.

Objectives

1) Continue implementation of tribal member preference stipulations in pasture and rangeland lease and permit advertisements.

2) Increase the proportion of Indian vs. non-Indian livestock operators grazing on CTUIR rangelands.

3) Generate employment and income to tribal members by grazing livestock on CTUIR rangelands and on open and unclaimed allotments off reservation (Treaty Right).

Standards and Guidelines

S28 Rangelands and grazable woodlands *shall* be identified as suitable or unsuitable for grazing in coordination with other resource uses.

S29 Grazing prescriptions *shall* be prepared for the use of livestock to manage vegetation on rangelands and grazable woodlands deemed suitable for grazing and should:

a. Promote livestock operator involvement in their development.

b. Base the frequency of defoliation and season of use on the rate and physiological conditions of plant growth.

c. During the active growing season, use perennial vegetation not more than 40% to maintain and/or promote the perennials.

d. Prevent large numbers of livestock from congregating especially on sensitive areas such as riparian areas.

e. Satisfy nutritional requirements of livestock.

f. Designate range readiness criteria, optimum stocking levels, and season of use.

g. Attain uniform grazing as much as possible throughout the unit.

h. Clearly articulate livestock operator responsibilities.

i. Provide for construction of any required infrastructure to implement preferred grazing systems.

S30 Establishment of livestock enterprises by the CTUIR and/or its members *shall* be promoted.

S31 Economic return to individual Indian landowners and the CTUIR *shall* be balanced with other land management objectives.

3.2.9 Historic Properties/Traditional Uses

Goals

1) Maintain and/or improve rangeland and grazable woodland integrity so that tribal members interacting with culturally significant places and plants/resources can continue to enrich their cultural identity, heritage, and spiritual needs.

2) Create healthy, resilient and dynamic rangeland and forest ecosystems so that the tribal community can retain and further develop their relationship with *First Foods* which is vital to CTUIR culture.

3) Maintain the integrity of historic properties and other cultural resources.

Objectives

1) Determine relative impact of different herbivores on culturally significant medicinal plants, roots, and berries.

2) Avoid impact to archaeological sites.

3) Disperse information to the tribal community on the location of medicinal plants, roots, and berries.

Standards and Guidelines

S32 Management activities *shall* comply with the NHPA which mandates all federally approved, funded, permitted, or licensed undertakings take into account effects on historic properties.

S33 Management activities *shall* comply with the CTUIR Historic Preservation Code.

S34 Documentation, protection, and preservation of prehistoric and historic sites, buildings, objects, antiquities and traditional cultural properties *shall* be accomplished through consultation with the CRPP and the THPO.

S35 Project level cultural resource assessments and THPO clearance *shall* be obtained prior to any ground disturbing activities.

S36 Grazing prescriptions *shall* provide for the protection and enhancement of cultural plants.

G7 Communication with THPO *should* occur early in planning for any ground disturbing activities.

G8 Ground disturbing projects should be designed to avoid damage or disturbance of cultural sites.

3.2.10 Transportation System

Goals

1) Provide access for forest, range, and fire management activities as well as cultural and subsistence use by Tribal Members.

2) Design, operate, and maintain a safe and economical transportation system in a manner protective of resource values.

Objectives

1) Identify the number and location of roads for management and access by Tribal members by developing a UIR Travel and Access Management Plan and the CTUIR Long-Term Transportation Systems Plan.

2) Establish design standards for different categories of both permanent and temporary roads.

3) Seek closure of roads not needed for resource management purposes or access by Tribal members.

Standards and Guidelines

S37 Road access *shall* be adequate to accomplish natural resource management objectives as well as subsistence use.

S38 Roads *shall* be operated and maintained according to management emphasis and maintenance levels appropriate to planned uses and activities, safety, economics, and impacts to land and resources.

G9 Temporary closure or restricted use of Indian Reservation Roads (IRR) *should* be used to control access or public use on lands as allowed by Title 25, CFR, Part 170 and the CTUIR Right of Way Policy (Resolution No. 09-119):

a. When necessary for public safety.

b. When necessary for fire prevention or suppression.

c. To protect fish and wildlife or other natural resources.

d. As appropriate due to road load limits.

e. To prevent damage to unstable roadbeds.

f. To protect burials in order for CRPP and THPO to assess the site.

g. If the road is a cultural access road (a road that provides access to sites for cultural purposes) and such closure or restriction is not otherwise governed by an agreement with a public authority: (a) during periods when people are involved in cultural activities or (b) to protect the health and safety of the public.

h. Unsafe conditions exist on the road.

i. A natural disaster requires a road closure.

j. To prevent traffic from damaging the roadway or facility.

k. Any other reason deemed to be in the public interest.

G10 For roads/trails not designated as part of the IRR Program, closures *should* be based on the following criteria:

a. Protection of soil and water

b. Maintenance or improvement of fish and wildlife habitat

c. Safety of users

   d. Cost of maintenance

   e. Expected need or use

3.2.11 Fire Management

Goals

1) Implement a fire/fuels management program that effectively reduces the hazard of accumulated fuels and achieves multiple resource objectives.

2) Use prescribed fire and non-fire fuels treatments to increase public/firefighter safety and protect Wildland Urban Interface (WUI) areas at risk.

3) Provide for the natural role of fire in maintaining a viable and healthy ecosystem.

4) Protect, improve, and restore native plant and animal species diversity.

5) Implement a prescribed fire in accordance with historical fire regimes (e.g., fire return intervals) where fire supports land management objectives.

Objectives

1) Use prescribed fire as a management tool to return fire to its natural role in fire-adapted ecosystems; reduce the potential for wildfire damage to natural resources, human life, and infrastructure; and enhance *First Foods*.

2) Where ecologically beneficial, use prescribed fire in conjunction with other management tools (mechanical, biological, chemical) in a holistic management approach to decrease invasive vegetation.

Standards and Guidelines

S39 All fire management activities *shall* comply with the Interagency Standards for Fire and Fire Aviation Operations (National Wildfire Coordinating Group (NWCG) 2022).

S40 Areas where use of prescribed fire can help meet vegetation objectives *shall* be identified utilizing logical boundaries.

S41 All prescribed burning *shall* be completed in accordance with an approved burn plan that specifically list vegetation management objectives.

S42 All prescribed burning *shall* be implemented in accordance with state and/or tribal smoke management plans.

G11 Available predictive models and methods *should* be used to minimize prescribed fire impacts to air quality.

3.2.12 Land Consolidation

Goals

1) Target fee parcels contiguous with CTUIR parcels for acquisition.

2) Continue efforts to consolidate land ownership by reducing fractionated ownership on allotments.

Objectives

1) Secure lands that produce critical natural resources including but not limited to water sources and riparian areas and/or instream fisheries habitat.

2) Secure fee tracts that control access to tracts managed by the CTUIR including large grazing units.

3) Secure lands critical for big game winter range.

Standards and Guidelines

S43 Acquisition of lands for the benefit of CTUIR *shall* be pursued for:

a. Community Development (Essential Governmental Services, Land Consolidation).

b. Cultural/Natural Resources Protection (First Foods, Fish and Wildlife Habitat).

c. Economic Development (Tribal Farming Enterprise, Industrial/ Commercial Infrastructure, Forest Management).

d. Tribal Member Interests (Employment and Housing Opportunities).

3.2.13 Monitoring and Evaluation

Goal

1) Provide sound data on biological, physical, and social parameters to measure impacts of management on achievement of goals and objectives.

Objectives

1) Use repeatable monitoring protocols that measure the relevant biological and physical parameters.

2) Maintain skilled personnel for the monitoring and evaluation program.

Standards and Guidelines

S44 Monitoring and evaluation *shall* be completed to ensure that standards along with the pertinent goals and objectives are met or that there is an upward trend towards meeting the standards.

S45 Monitoring necessarily *shall* be integrated in CTUIR natural resource management and regulatory programs.

3.2.14 Implementation Costs and Needs

Goals

1) Funding and staffing levels must be adequate to fully implement management direction including a monitoring program.

2) Ensure that flexibility exists so that management emphasis and strategies remain the same regardless of funding levels.

Objectives

1) Identify funds and staff required for implementation.

2) Pursue funding and cost sharing sources to carry out the management and monitoring program.

Standards and Guidelines

S46 Estimates of personnel and budgets required for program implementation *shall* be accurate and complete and take into account inherent uncertainties in order for informed decisions to be made.

S47 Efforts *shall* be made to identify and secure resources other than those resources provided by the CTUIR to implement the RMP.

G10 Cost effectiveness analysis *should* help identify trade-offs decision makers face when confronted with alternative courses of actions.

3.3 Targeted Vegetation Management with Livestock Grazing

3.3.1 Management Activities

The CTUIR would actively manage rangeland vegetation through biological, cultural, and chemical methods to move resource conditions toward the desired future conditions for rangeland health as defined by the goals and objectives. Steps in the planning for vegetation management on a specific site include (1) assess vegetation status (2) identify causes of invasive plant invasion and/or processes not functioning, (3) use ecological principles to guide decision-making, (4) choose appropriate tools and strategies based on the ecological principles, and (5) design and execute a plan using adaptive management. In addition, the CTUIR would use livestock grazing as a vegetation management tool and as a means to encourage economic development for the CTUIR and its members.

Examples of the types of management activities to facilitate use of rangelands, resolve conflicts, and protect important resource values are listed in Table 3-1. These general techniques would be applied on specific areas to eliminate or reduce resource impacts that natural succession alone would not resolve. The treatment methods used would depend on several important criteria that include: (1) the characteristics of the target species (distribution, density, and life cycle); (2) associated plant species; (3) the size, slope, accessibility and soil characteristics of the area to be treated; (4) weather conditions present at the time of treatment; (5) the proximity of the area targeted for vegetation treatment to sensitive and cultural areas; (6) the need for subsequent re-vegetation; and (7) the time of year treatment could occur.

Restoration of a site implies that in addition to simply re-establishing vegetative cover, the site be returned to pre-disturbance conditions and generally occupied by native plant communities. Objectives of a restoration plan to accomplish this task include: (1) use of reference sites to define the appropriate native plant community; (2) definition of the plant community composition and relevant structural information (cover, height); and (3) definition of the length of time required for compositional and structural restoration based on the appropriate plant community.

Table 3-1. Biological, Cultural, and Chemical Vegetation Treatment Actions.

Management Action	Description
Manual and Mechanical Tillage	Reduce Seed Production and Deplete Root Reserves and/or Remove Undesirable Plants
Prescribed Burns Annual Grasslands	Remove Invasive Annual Grasses Prior to Herbicide Treatment Reducing Competition with Native Perennials
Prescribed Burns Aspen Stands	Rejuvenate/Regenerate Dead and Dying Aspen Stands
Prescribed Burns Shrub Communities	Modify Vegetation Structure, Diversity, and Productivity
Fencing of Aspens Stands	Protect Young Aspen from Herbivores
Chemical and Biological Control of Invasive Plants	Remove Invasive Plants Reducing Competition with Native Perennials.
Targeted Livestock Grazing	Reduce Competitive Advantage of Invasive Plants
Seeding of Native Plant Species	Re-Establish Native Plant Species

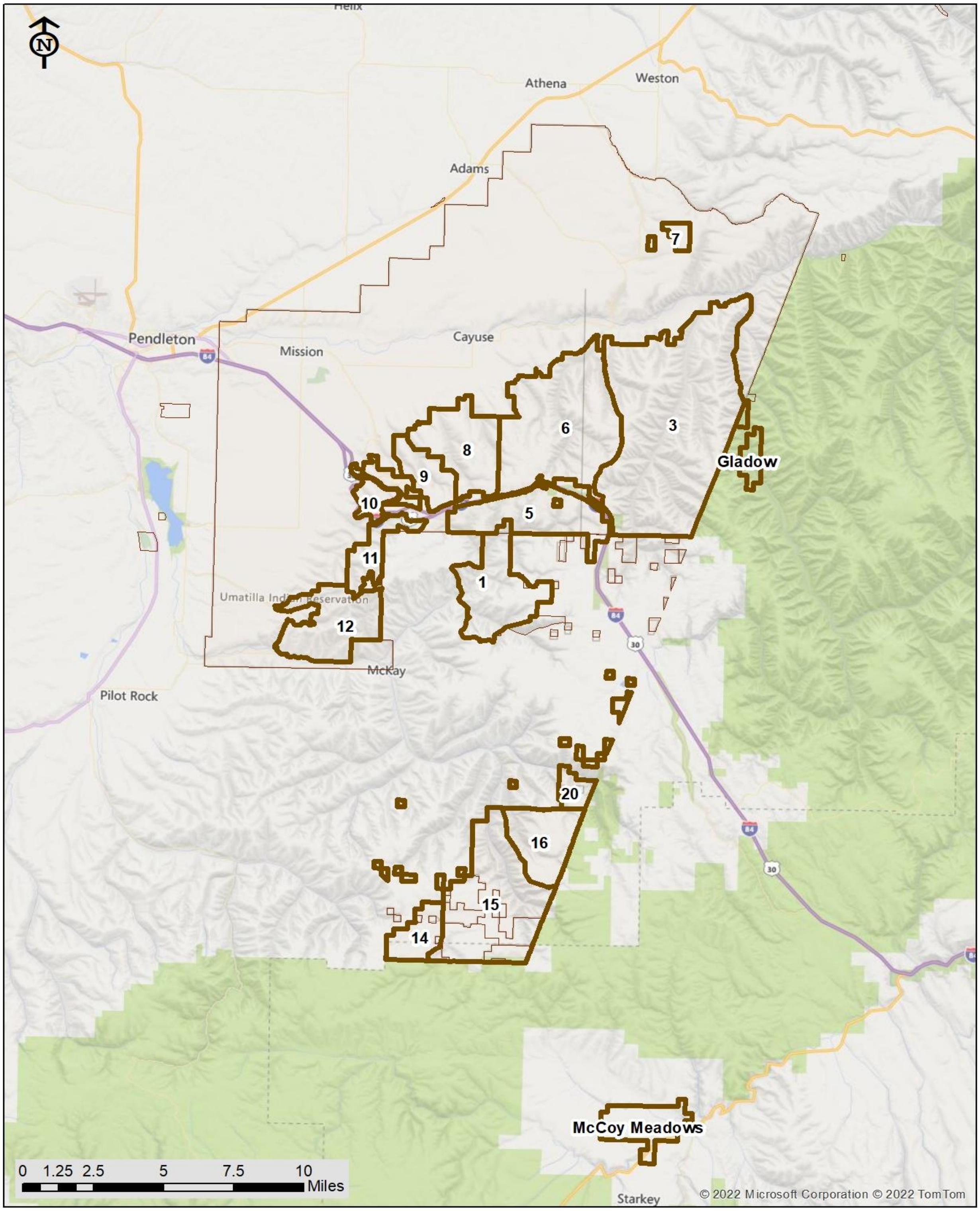

Figure 2-9. Current Developed Range Units.

3.3.2 Manual Treatments

Manual treatments are most effective as a means of treating small, isolated patches of annual or biannual undesired plant species that do not have an established seed bank and do not re-sprout from root fragments. Workers would cut plants above ground level, pull, grub, or dig out root systems to prevent subsequent regrowth, or otherwise enhance site conditions for desired plants. Plants should be pulled when soils are moist and before seeds are produced. A variety of hand tools could be employed. Manual treatments are often ineffective for the control of perennial or rhizomatous species or those with deep and/or easily broken roots (CTUIR 2018b)

3.3.3 Mechanical Treatments

Wheel tractors, crawler type tractors, or specially designed vehicles with attached implements would be used to treat vegetation. The best mechanical method for treating undesired plants in a particular location depends on the following factors: (1) characteristics of undesired species; (2) topography and terrain; (3) soil characteristics i.e., type, depth, amount and size of rocks, erosive nature, and susceptibility to compaction; and (4) climatic conditions. Mowing can be an effective weed management tool if timed to prevent or greatly reduce seed production (Sheley et al. 2017). Mowing may also be used to deplete root reserves. Tilling and disking may be used to mechanically remove undesired plant species.

3.3.3 Prescribed Fire

Prescribed fire is the planned application of fire in its natural or modified state under specific conditions of fuels, weather, and other variables to allow the fire to remain in a predetermined area and to achieve site-specific fire and resource management objectives. Each treatment requires specific burn plans with measurable burn objectives that clearly define operational procedures for implementation, monitoring, available contingency resources, and response to fire escapes. Management objectives of prescribed fire would include the control of certain species and enhancement of the growth, reproduction, or vigor of certain species. Prescribed fire is often most effective when conducted just before flower or seed set or at the young seedling or sapling stage for trees and shrubs. Prescribed fire can also be an effective tool for removing thatch in dense, invasive annual grass infestations prior to herbicide application. Treatments must be implemented in accordance with procedures outlined in the Interagency Prescribed Fire Planning and Procedures Guide (NWCG 2017).

Biological control refers to the intentional release of organisms, including plant-eating insects, nematodes, mites, or pathogens that attack specific invasive weed species. Biological control agents are used to manage invasive weed populations by reducing the population to an acceptable background level, by stressing target plants, and reducing competition with desirable plant species. While biological control agents are not effective for eradicating weed infestations, they can reduce populations below damaging thresholds and hinder further spread (CTUIR 2018b). Particular insects or combinations of insects may be introduced into an area of competing or undesired vegetation to selectively feed upon or infect target plants and reduce their density. One specific biological control agent generally will not reduce the target plant density to the desired level of control. In most instances, a complex of biological control agents is required to reduce the target plant density to an acceptable level.

3.3.4 Herbicide Applications

A wide variety of herbicides can be used to prevent the establishment and/or spread of undesired plants species. These chemicals vary widely in their mode of action, toxicity, non-target effects, and environmental effects. The CTUIR has compiled a list of allowable herbicides (Table 3-2) and adjuvants (Table 3-3), associated allowable application methods, geographic areas of application (i.e., riparian versus upland), and stream buffers (i.e., from bankfull width) (Table 3-4). The CTUIR herbicide and adjuvant list follows the BPA herbicide restrictions according to the BPA Habitat Improvement Program III Biological Opinion (USFWS 2013), allowing all herbicides and adjuvants with the same active ingredients as those included in the BPA list. Additionally, the CTUIR herbicide list allows the active ingredient Indaziflam which is used in Esplanade® and Rejuvra®. This herbicide is allowed for upland applications. Herbicides will be applied only to uses for which they are labeled, and all label restrictions will be followed.

Herbicides can be applied using ground-based or aerial methods. Ground-based methods include backpack foliar sprayers with hand-held wands, wicks, and truck- or ATV mounted spraying systems. The method of application depends on a number of variables including (1) treatment objective (removal or reduction), (2) the accessibility, topography and size of treatment area, (3) the characteristics of the target species and the desired vegetation, (4) the anticipated costs and equipment limitations, (5) the location of sensitive areas in the immediate vicinity, and (6) the meteorological and vegetative conditions of the treatment area at the time of application. Backpack sprayers are effective for small areas, areas inaccessible by vehicles, and for spot treatment of invasive weeds interspersed with desirable plant species. Backpack sprayers can target specific plants, thereby minimizing impacts on non-target species. Wicks can be used to target specific weeds and minimize spray on non-target plants. Truck- or ATV-mounted spraying systems are more efficient than backpack spraying for large infestations and infestations located adjacent to roads and trails. Aerial herbicide applications can be conducted with helicopters or fixed-wing aircraft. In non-agricultural areas, aerial herbicide applications will generally be limited to large infestations that are inaccessible using ground-based methods.

Table 3-2. Allowable Herbicides.				
Active Ingredient	Common Trade Names[1]	Typical Application Rate (active ingredient per acre)	Maximum Label Application Rate (active ingredient per acre)	General Geographic Application Areas
2,4-D (amine)[2]	Many	0.5 to 1.5 lbs.	4.0 lbs.	Upland[3]/ Riparian
Aminopyralid	Milestone®	0.11 to 0.22 lbs.	0.375 lbs.	Upland / Riparian
Chlorsulfuron	Telar®	0.25 to 1.33 oz	3.0 oz	Upland
Clethodim	Select®	0.125 to 0.5 lbs.	0.50 lbs.	Upland
Clopyralid	Transline®	0.1 to 0.375 lbs.	0.5 lbs.	Upland / Riparian
Dicamba	Banvel®	0.25 to 7.0 lbs.	8.0 lbs.	Upland / Riparian
Glyphosate	Many	0.5 to 2.0 lbs.	3.75 lbs.	Upland / Riparian
Imazapic	Plateau®	0.063 to 0.189 lbs.	0.189 lbs.	Upland / Riparian
Imazapyr	Arsenal® Habitat®	0.5 to 1.5 lbs.	1.5 lbs.	Upland / Riparian
Indaziflam[4]	Esplanade®	0.038 oz	0.0272 oz	Upland
Metsulfuron Methyl	Escort®	0.33 to 2.0 oz	4.0 oz	Upland
Picloram	Tordon®	0.125 to 0.50 lbs.	1 lbs.	Upland
Sethoxydim	Poast®	0.1875 to 0.375 lbs.	0.375 lbs.	Upland
Sulfometuron Methyl	Oust®	0.023 to 0.38 oz	2.25 oz	Upland
Triclopyr TEA)	Garlon 3A®	1.0 to 2.5 lbs.	9.0 lbs.	Upland / Riparian

[1]Herbicides with the active ingredients shown in this table are allowed. Common trade names are provided as example brands that use those active ingredients.

[2]On June 30, 2011, NMFS issued a final biological opinion addressing the effects of this herbicide on ESA-listed Pacific salmonids. The opinion concluded that EPA's proposed registration of certain uses of 2, 4-D, including aquatic uses of 2, 4-D are likely to jeopardize the continued existence of the 28 endangered and threatened Pacific salmonids. As a result of this consultation, use of this herbicide will comply with all relevant reasonable and prudent alternatives from the 2011 Biological Opinion.

[3]Uplands are as defined as the combined average height of two site potential trees or 300 feet (whichever is greater).

[4]Indaziflam is not an approved herbicide active ingredient in the formal Section 7 programmatic consultation on BPA's Columbia River Basin Habitat Improvement Program but is approved by the CTUIR to use within the IWMP planning area outside of BPA WMAs.

Table 3-3. Allowable Adjuvants.			
Adjuvant Type	Trade Name	Labeled Mixing Rates per Gallon of Application Mix	General Application Areas
Colorants	Dynamark™ U.V. (red)	0.1 fl oz	Riparian
	Aquamark™ Blue	0.1 fl oz	Riparian
	Dynamark™ U.V. (blue)	0.5 fl oz	Upland
	Hi-Light® (blue)	0.5 fl oz	Upland
Surfactants	Activator 90®	0.16 to 0.64 fl oz	Upland
	Agri-Dex®	0.16 to 0.48 fl oz	Upland
	Entry II®	0.16 to 0.64 fl oz	Riparian
	Hasten®	0.16 to 0.48 fl oz	Upland
	LI 700®	0.16 to 0.48 fl oz	Riparian
	R-11®	0.16 to 1.28 fl oz	Riparian
	Super Spread MSO®	0.16 to 0.32 fl oz	Riparian
	Syl-Tac®	0.16 to 0.48 fl oz	Upland
Drift Retardants	41-A®	0.03 to 0.06 fl oz	Riparian
	Valid®	0.16 fl oz	Upland

Table 3-4. Required Herbicide Buffer Widths (From Bankfull Width.					
Active Ingredient	Broadcast Application[1]		Backpack Sprayer/Bottle Spot Spray Application[2]		Hand Application[3]
	Minimum buffer from bankfull width (feet)	Max/Min wind speed (miles per hour)	Minimum buffer from bankfull width (feet)	Max/Min wind speed (miles per hour)	Minimum buffer from bankfull width (feet)
2,4-D (amine)2	100	10/2	50	5/2	15
Aminopyralid	100	10/2	15	5/2	0
Chlorsulfuron	100	10/2	15	5/2	0
Clethodim	NA	NA	50	5/2	50
Clopyralid	100	10/2	15	5/2	0
Dicamba	100	10/2	15	5/2	0
Glyphosate 1 Glyphosate 2	100	10/2	15 100	5/2	100
Imazapic	100	10/2	15	5/2	0
Imazapyr	100	10/2	15	5/2	0
Indaziflam[4]	100	10/2	100	5/2	100
Metsulfuron Methyl	100	10/2	15	5/2	0
Picloram	100	8/2	100	5/2	100
Sethoxydim	100	10/2	50	5/2	50
Sulfometuron Methyl	100	10/2	15	5/2	0
Triclopyr (TEA)	NA	NA	50	5/2	0 for stump application. 15 feet for other applications
Herbicide Mixtures	100	Most conservative of herbicides	15	Most conservative of herbicides	Most conservative of herbicides

[1]Ground-based only broadcast application methods via truck/ATV with motorized low-pressure, high-volume sprayers using spray guns, broadcast nozzles, or booms.
[2]Spot and localized foliar and basal/stump applications using a hand-pump backpack sprayer or field-mixed or pre-mixed hand-operated spray bottle.
[3]Hand applications to a specific portion of the target plant using wicking, wiping or injection techniques. This technique implies that herbicides do not touch the soil during the application process.
[4]Indaziflam is not an approved herbicide active ingredient in the formal Section 7 programmatic consultation on BPA's Columbia River Basin Habitat Improvement Program but is approved by the CTUIR to use within the IWMP planning area outside of BPA WMAs.

3.3.5 Targeted Grazing

Targeted grazing is the application of a specific kind of livestock at a determined season, duration, and intensity to accomplish defined vegetation or landscape goals. The shift in emphasis from good grazing management to targeted grazing is that targeted grazing refocuses outputs of grazing from livestock production to vegetation and landscape enhancement. Targeted grazing should be considered as another tool for constructing desirable ecosystems. It can and should be used in combination with other technologies, such as burning, applying herbicides, and seeding of native plants. Most of these traditional management tools have significant economic, ecological, or social implications that limit their application.

A targeted grazing prescription must specify the time grazing should be applied for maximum impact. This optimum time for application of targeted grazing as a vegetation management technique is when the target plants are most susceptible to damage by grazing and when they are most palatable to livestock. How acceptable or palatable a plant depends in part on the plant's nutritive characteristics. The nutritive value or potential toxicity of plants varies throughout the growing season. Most plants are highly digestible and nutritious when they are young, and they become less nutritious as the season advances. It is also critical to apply grazing at a time of year when the target plant is susceptible to damage from defoliation. Plants are generally most susceptible to grazing before they begin to form seeds. Enticing livestock to eat and cause damage to specific target plants requires careful selection of the time of year to apply grazing.

Proper grazing schemes should incorporate the management actions listed in Table 3-5. The CTUIR would commit to the development and implementation of management grazing unit technical plans for all grazing units including identification of prescribed grazing systems. The NRCS, BIA, and CTUIR would fund the range improvements required to implement these management plans. As part of the process for developing the grazing unit technical plans, the CTUIR would actively seek opportunities to adjust unit boundaries to incorporate small tracts not currently within the units. The CTUIR believes that incorporation of the small tracts currently under lease as pastures would offer greater flexibility and opportunity to meet resource objectives.

Table 3-5. Livestock Grazing Management Actions.

Management Actions	Description
Grazing Intensity	Number and class of livestock as well as season of use determine the intensity of grazing and its impacts.
Grazing Flexibility	Livestock grazing can be adjusted as necessary to result in minimal to no impacts on the growth cycle of key plant species, soils, instream and riparian ecosystems, and other factors.
Reduced, Increased, Suspended or Restored AUMs	Based on resource conditions and trend, evaluated through monitoring and evaluation, AUMs may be reduced or increased.
Structural Range Improvements	Construction of fences, cattleguards, and water developments are required to implement prescribed grazing systems.

3.3.6 Best Management Practices

Tables 3-6 and 3-7 lists BMPs for rangeland vegetation treatments. Additional BMPs are contained in the IWMP for the UIR (CTUIR 2018b). The CTUIR will ensure that appropriate BMPs are incorporated as part of the planning and implementation for project activities.

3.3.7 Combinations of Management Activities

It is likely that the BIA and CTUIR will have to use a combination of techniques to restore native grasslands now dominated by exotic annual grasses. Successfully establishing native perennial grass seedlings in stands that support less than 5-10% perennial grass cover may require burning annual grasses to provide a suitable seedbed. Prior to seeding, one or more chemical treatments may be required to kill young annual grasses sprouting in the burned or tilled area. Methods such as timed grazing, herbicides, and prescribed fire may be required to decrease seed production and seed bank of undesired plant species. Grazing, herbicides and biocontrol may also be used to shift competitive balances between undesired and desired plant species

3.4 Encourage Use of Indian Owned Rangeland Resources by Members of the CTUIR and Generate Income for the Indian Landowners

Title 25, CFR, Parts 162 and 166 prescribe the process for awarding grazing privileges on trust lands. Consistent with the process for awarding grazing privileges on trust lands, the BIA and CTUIR will encourage use of Indian owned rangeland resources by members of the CTUIR either as individual operators, operators who have formed a livestock cooperative or a Tribal livestock enterprise. Previous advertisements for the sale of grazing privileges on the UIR have allowed members of the CTUIR the option of meeting the high bid of a non-Indian Operator to secure grazing privileges. One step in the leasing and/or permitting process is the determination of minimum acceptable grazing rental rates based on an appraisal of comparable grazing rental rates in northeast Oregon. The last appraisal indicated a rate of $16.00-$17.00 per Animal Unit Month (AUM) is justified which would generate $110,634.00 per year. Appraisals are updated for each new lease or permit period.

Table 3-6. Best Management Practices for Manual, Mechanical, Biological, Prescribed Fire and Herbicide Treatment Activities.	
BMP No.	Description
Manual and Mechanical Methods	
VEGE-1	Confine mechanical treatments to gentle slopes and ideal soil conditions to prevent accelerated soil erosion.
VEGE-2	Avoid erosion hazard areas, areas of compactable soils, and riparian areas susceptible to bank damage.
VEGE-3	When appropriate, leave plant debris on site to retain moisture, supply nutrients, and reduce erosion.
Biological Control	
VEGE-4	Use only biological control agents that have been tested and approved to ensure they are host specific.
Prescribed Fire	
VEGE-5	Apply prescribed fire in accordance with an approved burn plan.
VEGE-6	Avoid burning herbicide-treated vegetation for at least six months.
VEGE-7	All personnel conducting the prescribed burn must meet NWCG standards for the position they are occupying.
Herbicide Application	
VEGE-8	Apply herbicides only by an appropriately licensed applicator using an herbicide specifically targeted for a particular plant species that will cause the least impact to non-target species.
VEGE-9	Adhere to all aspects of the herbicide label for use, storage, and transport.
VEGE-10	Limit herbicide carriers (solvents) to water or specifically labeled vegetable oil.
VEGE-11	Mix herbicides more than 150 feet from any natural waterbody to minimize the risk of an accidental discharge; no more than three different herbicides may be mixed for any one application.
VEGE-12	Conduct mixing and loading operations in an area where an accidental spill would not contaminate surface or groundwater.
VEGE-13	Apply herbicides at the lowest effective label rates, including the typical and maximum rates. For broadcast spraying, application of herbicide or surfactant will not exceed the typical label rates.
VEGE-14	Do not spray when wind speeds exceed 10 miles per hour or are less than 2 miles per hour.
VEGE-15	Keep boom or spray as low as possible to the ground to reduce wind effects.
VEGE-16	Do not apply herbicides during temperature inversions, or when ground temperatures exceed 80 degrees Fahrenheit.
VEGE-17	Do not spray when rain, fog, or other precipitation is falling or is imminent.
VEGE-18	Increase spray droplet size whenever possible by decreasing spray pressure, using high flow rate nozzles, using water diluents instead of oil, and adding thickening agents.
VEGE-19	Treatment will be terminated if air turbulence, for example thermal updrafts, is sufficient to affect normal chemical distribution patterns.
VEGE-20	Monitor weather conditions at spray sites hourly. Additional weather monitoring would occur whenever a weather change may impact safe placement of the herbicide on the target area.

Table 3-7. Best Management Practices for Livestock Grazing.	
BMP No.	Description
GRAZ-1	Promote ecologically stable and desired plant communities on both upland and riparian sites through prescribed grazing systems.
GRAZ-2	Address the kind, numbers, and class of livestock, season, duration, distribution, frequency and intensity of grazing use and livestock health.
GRAZ-3	Incorporate management of riparian areas into overall management plan for the grazing unit.
GRAZ-4	Reduce soil loss above the background rate and maintain/improve soil condition.
GRAZ-5	Maintain adequate vegetative cover to prevent accelerated soil erosion due to both wind and water.
GRAZ-6	Provide for adequate rest after grazing for regrowth of desirable plants.
GRAZ-7	All areas of a grazing unit must be within one mile of a water source for livestock.
GRAZ-8	Utilization levels will not exceed 40% by weight for perennial grasses and 80 % by weight for annual grasses in upland plant communities. Utilization must leave a 6″ stubble height for herbaceous plans in riparian plant communities and 50% of current year's growth on shrubs.
GRAZ-9	Streambank alteration must not exceed 20%.
GRAZ-9	Livestock operators must strictly adhere to all provisions of grazing permits and leases as well as their annual operating instructions.
GRAZ-10	Identify areas that are heavily grazed as well as those that receive less than full use.
GRAZ- 11	Use salting, water developments, fencing, and herding to change livestock behavior and use patterns.
GRAZ-12	Place salt and minerals away from water sources to better distribute grazing.
GRAZ- 13	Construct rangeland infrastructure in a way that enables access by tribal members. Fence stiles, gates, wire heights, and types shall be constructed to allow easy access for human traffic to access and gather sacred foods.

CHAPTER 4 – IMPLEMENTATION OF THE MANAGEMENT PLAN

4.1 Implementation Steps

The RMP will be implemented through the following steps:

1) Pursue funds to carry out the management activities and monitoring program.

2) Complete rangeland health assessments to indicate functional status of ecological processes and site integrity.

3) Implement long term monitoring program.

4) Use ecological principles to guide decision making.

5) Choose appropriate tools and strategies based on principles.

6) Design and implement site specific management plans using adaptive management.

4.2 Staff and Implementation Costs

The CTUIR estimates that one rangeland management specialist would be required to plan and implement vegetation treatments and one range technician would be required to implement targeted livestock grazing. Table 4-1 lists the estimates for anticipated personnel costs and total program costs. The base funding estimate of $159,960 should be considered a re-occurring cost. Restoration of a site requiring prescribed burning, herbicide treatment, and seeding of native grasses and forbs may reach $500 -700 per acre. The CTUIR believe that $75,000 per year could be spent on restoration activities on 100 acres as well as $55,000 on cultural resource surveys that will be required prior to ground disturbing activities.

Table 4-1. Range Program Costs per Year

Description	Cost
Rangeland Management Specialist	$ 70,000
Range Technician	$ 55,000
Fringe Benefits (33%)	$ 20,460
Travel and Training	$ 1,500
Vehicle	$ 10,000
Equipment, Supplies and Materials	$ 3,000
Sub-Total	$159,960
Vegetation Treatments	$ 75,000
Cultural Resource Surveys	$ 55,000
Sub-Total	$130,000
Grand Total	$289,960

4.3 Rangeland Health Assessments

The U.S. Geological Survey (USGS), Agricultural Research Service (ARS), Bureau of Land Management (BLM) and NRCS have developed a technique to assess rangeland health (Pellant et al. 2005). Because rangelands are complex ecosystems, it is difficult to attain a single rating of rangeland health. This technique assesses separately three attributes of land health. These rangeland health attributes are:

1) **Soil/site stability**—the capacity of the site to limit redistribution and loss of soil resources (including nutrients and organic matter) by wind and water.

2) **Hydrologic function**—the capacity of the site to capture, store, and safely release water from rainfall, run-on, and snowmelt (where relevant), to resist a reduction in this capacity, and to recover this capacity following degradation.

3) **Integrity of the biotic community**—the capacity of the site to support characteristic functional and structural communities in the context of normal variability, to resist loss of this function and structure due to disturbance, and to recover following disturbance.

Indicators are components of a system whose characteristics (e.g., presence or absence, quantity, of distribution) are used as an index of an attribute that is too difficult, inconvenient, or expensive to measure. Several indicators must be used to gain an understanding about each attribute of land health. By using a qualitative, observational procedure, the functional status of such indicators can be assessed.

This fast assessment technique includes both plant and soil indicators that can help land managers interpret and assess rangeland health. In the past, indicators used in rangeland monitoring and resource inventories by land managers have focused on vegetation (e.g., production, composition, density) or soil stability and were used to indicate rangeland condition or livestock carrying capacity. Such single indicator assessments are inadequate to determine rangeland health because they do not reflect nor assess the complexity of ecological processes. Rather than a single indicator, a suite of key indicators should be used for an assessment.

In the "Rangeland Health" system, 17 indicators are used to gauge the three rangeland health attributes: soil/site stability, hydrologic function, and the integrity of the biotic community of selected rangeland ecological sites.

4.4 Adaptive Management

The fundament principle of adaptive management is that our knowledge of ecological systems is incomplete introducing risk and uncertainly in our ability to manage natural resources (Stankey et al. 2005). Adaptive management, or the continual process that ensures that management strategies will be adjusted to meet goals and objectives through planning, implementation, monitoring, and evaluation will be used throughout implementation. Adaptive management emphasizes flexibility necessary to make adjustments while ensuring results. A continual feedback loop based on new information, allows for mid-course corrections to grazing schedules, standards and guidelines, and underlying assumptions in order to meet planned goals and objectives (Figure 4-1).

The adaptive management process provides a capacity to act in an informed, judicious manner in the presence of risk and uncertainty. Adaptive management requires problem framing and problem-solving processes, documentation and monitoring protocols, roles, relationships, and responsibilities, and assessment and evaluation processes. Learning is a key output of the adaptive management process. A commitment to adaptive management is built upon learning, collaboration, and integrative management. The adaptive management process provides a capacity to act in an informed, judicious manner.

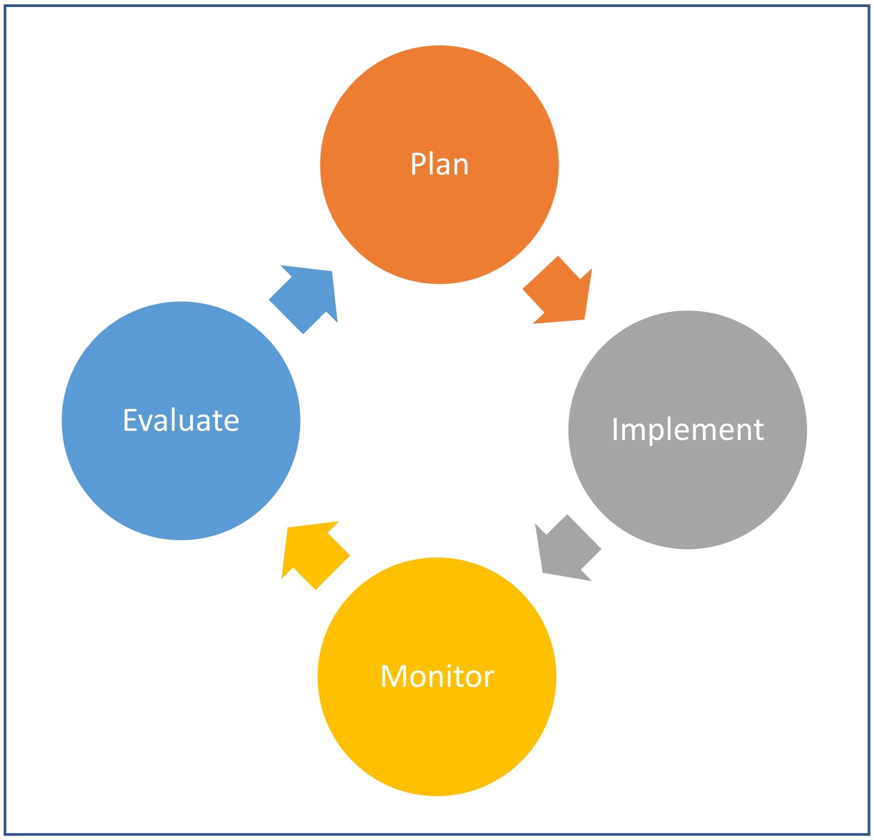

Figure 4-1. Adaptive Management Cycle.

4.5 Monitoring and Evaluation

Monitoring is a critical part of the adaptive management cycle. The process of restoring and maintaining ecosystem function is implemented through management actions on a site-specific basis. Whether or not management actions are achieving the stated goals and objectives and the landscape is moving toward a desired future condition will be determined by the monitoring of vegetation composition and structure as well as forage utilization by ungulates at specific sites. The result of these monitoring efforts will then be evaluated at the landscape level to determine the overall rangeland health. The conclusions reached will also be used to make recommendations on whether to continue current management or to change management practices to meet goals and objectives.

Adaptive Management requires three types of information: short- and long-term monitoring data, knowledge of potential drivers to changes in vegetation composition and structure, and clearly defined predictions of management effects. Each successful monitoring and assessment program must begin with clearly defined objectives for why monitoring is taking place, what is to be measured, and how the data will be analyzed and used for management purposes. One of the primary objectives of the monitoring program will be to detect long-term changes in the status of three basic attributes of riparian and upland ecosystems: soil and site stability, hydrologic function and biotic integrity. State and transition models can be used to integrate monitoring data with current knowledge about potential management. Figure 4-2 depicts the steps in the design and implementation of a monitoring program.

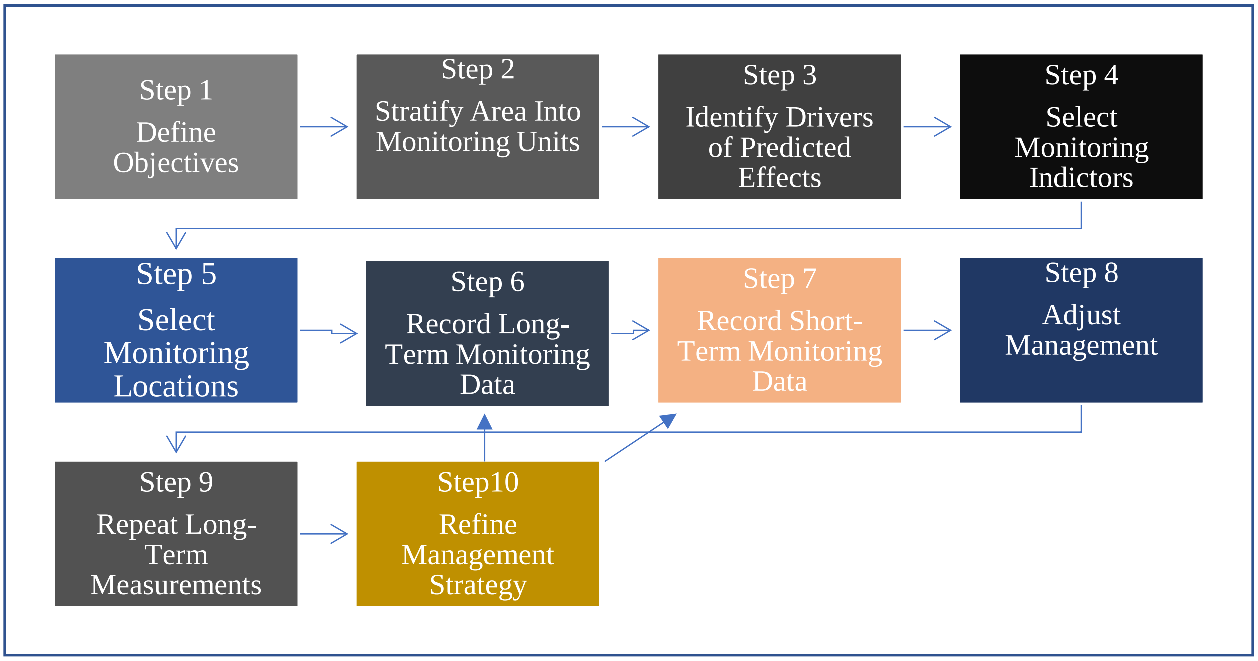

Figure 4-2.   Monitoring Program Design and Implementation Steps.

There are numerous monitoring techniques available that demand different levels of experience, time commitments, and tools. The appropriate method or methods selected for monitoring depend on the available resources to the range management program and the management needs. Recognizing that available resources will likely be limited, the proposed monitoring program assumes that vegetation composition and structure is the most important factor affecting soil and site stability, hydrologic function, and biotic integrity (Table 4-2). Vegetation composition and structure is also the most important factor affecting the presence and abundance of many First Foods.

Riparian areas are particular areas of concern. Stabilizing plants are needed where they can buffer the forces of flowing water and influence erosion and sediment deposition. The greenline is the first line of perennial vegetation on or near the low water edge (Winward 2000). Most often it occurs at or slightly below the bankfull stage. Streambanks are covered and stable if they are covered with perennial vegetation, cobble-size or larger rock, or anchored wood, and they do not have indications of erosion, breakdown, shearing or trampling that expose plant roots. Change in streambank stability may reflect incision, healing or accumulated damage from use impacts such as streambank alteration.

Table 4-2. Rangeland Monitoring – Components, Monitoring Methods, and Monitoring Schedule.

Component	Methods	Schedule
Upland Vegetation		
Vegetation Composition and Structure	Nested Frequency (BLM 1996a)	Repeat Every Five Years
Forage Utilization	Height-Weight (BLM 1996b)	Annual
Riparian Vegetation		
Vegetation Composition and Structure	Line Intercept for Shrubs and Trees (Cainfield 1941) Canopy Cover for Herbaceous Plants (BLM 1996a)	Repeat Every Five Years
Forage Utilization	Woody Plant Use Class (BLM 2011) Stubble Height (BLM 1996b)	Annual
Streambank Stability and Anadromous Fish Spawning Use		
Streambank Stability	Streambank Alteration (BLM 2011)	Repeat Every Five Years
Anadromous Fish Spawning Use	No. of Redds (CTUIR 2014)	Annual If redds are found, Monitor for Trampling Damage Every Two Weeks When Livestock Are Present

4.7 Grazing Leases and Permits for Targeted Grazing and/or Economic Development

Title 25, CFR, Parts 162 and 166 prescribe requirements for the issuance of grazing leases and permits respectively. Additional guidance can be found in the Indian Affairs Handbook, 54 IAM 1-H. Major steps include:

1) Secure consent of individual landowners for allotted lands and Tribal Government for tribally owned lands.

2) Establish the kind of livestock allowed, the grazing capacity, and season of use.

3) Develop a plan for the management unit consistent with the goals and objectives of the RMP that includes a description of prescribed management practices and stipulations pertinent to the lessee's or permittee's activities.

4) Determine the minimum acceptable rental rate for the grazing privileges.

5) Complete negotiated or competitive sale of the grazing privileges.

6) Issue the grazing lease and/or permit.

7) Administer the grazing lease or permit including collection and distribution of grazing rental as well as issuing to the lease or permit deemed necessary during the term of the lease or permit.

8) Determine compliance with the terms of the lease or permit by the lessee or permittee.

CHAPTER 5 – LIST OF PREPARERS AND CONTRIBUTORS

Table 5-1 is a list of the IDT members and consultants who contributed to the preparation of the RMP.

Table 5-1. List of Contributors		
Name	Position Title	Area of Expertise
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CHAPTER 6 – LITERATURE CITED

ACOE. 1975. Lower Snake River Fish and Wildlife Compensation Plan. US Army Corps of Engineers Walla Walla District. Walla Walla, WA.

ACOE. 1999. Upper Umatilla River Flood Study. US Army Corps of Engineers Portland District. Portland, OR.

Agee, J.K. 1993. Fire Ecology of Pacific Northwest Forests. Island Press. Washington D.C.

Agee, J K. 1996. Fire Regimes and Approaches for Determining Fire History. In: Hardy, Colin C.; Arno, Stephen F., eds. The Use of Fire in Forest Restoration. USDA U.S. Forest Service. Gen. Tech. Rep. INT-GTR-341. Ogden, UT.

American Sheep Industry. 2006. Targeted Grazing Handbook. American Sheep Industry Association. Englewood, CO.

Averett J.P., L.R. Morris, B.J. Naylor, R.V. Taylor and B.A. Endress. 2020. Vegetation Change Over Seven Years in the Largest Protected Pacific Northwest Bunchgrass Prairie Remnant. PLoS ONE 15(1): e0227337.

Bartelt, G. 1997. Improving Habitat Quality of Rotationally Grazed Pastures for Grassland Birds. Final report. Wisconsin Department of Natural Resources, Monona, WI.

Bartholow, J. 1992. POP-II System Documentation. IBM-PC Version 7.00 Fossil Creek Software, Fort Collins, CO.

Bell, J.H. 1988. Habitat Use, Movements, and Home Range of White-Tailed Deer in the Umatilla River Drainage, Northeast Oregon. M.S. Thesis, University of Idaho. Moscow, ID.

Belt, G.H., J. O'Laughlin, and T. Merrill. 1992. Design of Forest Riparian Buffer Strips for the Protection of Water Quality: Analysis of Scientific Literature. Univ. of Idaho, Idaho Forest, Wildlife and Range Policy Group Report No. 8. Moscow, ID.

BLM. 1996a. Sampling Vegetation Attributes. Interagency Technical Reference Guide BLM/RS/ST-96/002+1730. National Applied Resource Center. Denver, CO.

BLM. 1996b. Utilization Studies and Residual Measurement. Interagency Technical Reference Guide BLM/RE/ST-96/004+1730. National Applied Resource Center. Denver, CO.

BLM. 2011. Riparian Area Management: Multiple Indicator Monitoring (MIM) of Stream Channels and Streamside Vegetation. Interagency Technical Reference BLM/OC/ST-10/003+1737+REV. National Operations Center, Denver, CO.

Boyd, M., Butcher, D., Kasper, B. and P. Leinenbach. 1999. Draft Umatilla River Subbasin Draft Temperature Assessment. Oregon Department of Environmental Quality.

Buchanan, D., M. Hanson, and R. Hooton. 1997. Status of Oregon's Bull Trout: Distribution, Life History, Limiting Factors, Management Considerations, and Status. USDOE Bonneville Power Administration Technical Report DOE/BP-34342-5. Portland, OR.

Close, D A., M. Fitzpatrick, H. Li, B. Parker, D. Hatch, and G. James. 1995. Status Report of the Pacific lamprey (*Lampetra tridentata*) in the Columbia River Basin. USDOE Bonneville Power Administration Technical Report DOE/BP-39067-1, Portland, OR.

Contor, C., E. Hoverson, P. Kissner, and J. Volkman. 1996. Umatilla Basin Natural Production Monitoring and Evaluation Annual Progress Report 1994-1995. USDOE Bonneville Power Administration Technical Report DOE/BP-75349-2. Portland, OR.

Contor, C. 2004. Umatilla Basin Natural Production Monitoring and Evaluation 1998-2002. USDOE Bonneville Power Administration Summary Report DOE/BP-00004115-1. Portland, OR.

Cornoyer, N.A. 1872 *Commissioner of Indian Affairs Report No. 75*. Submitted September 3, 1872 to the Superintendent of Indian Affairs by the U.S. Indian Agent. Electronic document, http://digital.library.wisc.edu/1711.dl/History.AnnRep72, accessed October 2, 2016.

Cornoyer, N.A. 1876 *Commissioner of Indian Affairs Report. [Reports of Agents in Oregon]*. Submitted August 22, 1876 to the Commissioner of Indian Affairs by U.S. Indian Agent. Electronic document,
http://digital.library.wisc.edu/1711.dl/History.AnnRep76, accessed October 3, 2016.

CTUIR and ODFW 1990. Salmon and Steelhead Production Plan Umatilla River Subbasin. Northwest Power and Conservation Council Columbia Basin System Planning. Portland, OR.

CTUIR. 1997. Umatilla River Basin Wetland Protection Plan: Minthorn Springs, Umatilla Indian Reservation. Confederated Tribes of the Umatilla Indian Reservation, Department of Natural Resources. Pendleton (Mission), OR.

CTUIR. 2001. Wanaket Wildlife Area Plan. USDOE Bonneville Power Administration. Portland, OR.

CTUIR 2002. Rainwater Wildlife Area Watershed Management Plan. USDOE Bonneville Power Administration. Portland, OR.

CTUIR. 2005. Confederated Tribes of the Umatilla Indian Reservation Total Maximum Daily Load for Temperature and Turbidity. Confederated Tribes of the Umatilla Indian Reservation, Department of Natural Resources. Pendleton (Mission), OR.

CTUIR. 2008. Water Quality Management Plan. Confederated Tribes of the Umatilla Indian Reservation, Department of Natural Resources. Pendleton (Mission), OR.

CTUIR. 2010. Comprehensive Plan. Confederated Tribes of the Umatilla Indian Reservation. Tribal Planning Office. Pendleton (Mission), OR.

CTUIR. 2011. Feral Horse Policy. Confederated Tribes of the Umatilla Indian Reservation, Department of Natural Resources. Pendleton (Mission), OR.

CTUIR. 2012. A History of Forest and Range Management Umatilla Indian Reservation, 1855-2002. Confederated Tribes of the Umatilla Indian Reservation, Department of Natural Resources. Pendleton (Mission), OR.

CTUIR. 2014. Umatilla Basin Natural Production Monitoring and Evaluation Spawning Survey Protocol. Confederated Tribes of the Umatilla Indian Reservation, Department of Natural Resources. Pendleton (Mission), OR.

CTUIR. 2018a. Confederated Tribes of the Umatilla Indian Reservation Response Plan for Wolf Conflicts on the Umatilla Indian Reservation. Confederated Tribes of the Umatilla Indian Reservation, Department of Natural Resources. Pendleton (Mission), OR.

CTUIR. 2018b. Integrated Weed Management Plan. Confederated Tribes of the Umatilla Indian Reservation, Department of Natural Resources. Pendleton (Mission), OR.

Daubenmire, R. 1970. Steppe Vegetation of Washington. Washington Agricultural Experiment Station Technical Bulletin 62. Washington State University. Pullman, WA.

DJ &A P.C. 2021. Rangeland Inventory Report of the Umatilla Indian Reservation. DJ&A P.C. Missoula, MT.

Endress, B., E. Quaempts, and S. Steinmetz. 2019. First Foods Upland Vision. Confederated Tribes of the Umatilla Indian Reservation, Department of Natural Resources. Pendleton (Mission), OR.

EPA. 1994. Background for NEPA Reviewers: Grazing on Federal Lands. U.S. Environmental Protection Agency, Office of Federal Activities. Washington, D.C.

Gonthier, J.B. and D.D. Harris. 1977. Water Resources of the Umatilla Indian Reservation. USDI U.S. Geological Survey Water Resources Investigations Report 77-3. Portland, OR

Gregory S., F. Swanson, W. McKee, and K. Cummins. 1991 An Ecosystem Perspective of Riparian zones. BioScience 41:540–551.

Howell, P., & P. Sankovich, S. Gunckel, and C Allen. 2018. A Demographic Monitoring Strategy for Bull Trout Core Areas in Northeastern Oregon and Portions of Southeastern Washington. Available Online at: https://www.researchgate.net/publication/330305048.

Jansen V. and E. Winford. 2020. How is Climate Change Impacting the Working Rangelands of the Pacific Northwest? University of Idaho Rangeland Center Fact Sheet 2. Moscow, ID.

Johnson, C. G. and R. R. Clausnitzer. 1992. Plant Associations of the Blue and Ochoco Mountains. USDA Forest Service Pacific Northwest Region Technical Publication R6-ERW-TP-036-92. Portland, OR.

Lane, R.B. and B. Lane 1979. Traditional Fisheries of the Walla Walla, Cayuse, and Umatilla. Unpublished Report Confederated Tribes of the Umatilla Indian Reservation. Pendleton, OR.

Luckey, J.C. 1890 *Commissioner of Indian Affairs Report. [Reports of Agents in Oregon]*. Submitted August 1, 1890 to the Commissioner of Indian Affairs by U.S. Indian Agent. Electronic document, https://digital.library.wisc.edu/1711.dl/YPYZ7T5SW2ICO8D, accessed October 3, 2016.

Moore, K., K. Jones, and J. Dambacher. 1999 Methods for Stream Habitat Surveys Aquatic Inventories Project. Oregon Department of Fish and Wildlife, Information Report 97-4. Portland, OR.

Mosley. J and L Roselle. 2006. Targeted Grazing to Suppress Invasive Annual Grasses. K. Launchbaugh, J. Walker (eds.). Targeted Grazing: A Natural Approach to Vegetation Management and Landscape Enhancement. American Sheep Industry Association. Centennial, CO.

NMFS. 1996. Making Endangered Species Act Determinations of Effect for Individual and Group Actions at the Watershed Scale. Environmental and Technical Services, Habitat Conservation Branch. Seattle WA.

NRCS. 2003. National Range and Pasture Handbook. USDA Grazing Lands Technology Institute. Washington, D.C.

Nielsen, A.E. 1991. Trampling the Archaeological Record: An Experimental Study. American Antiquity, 56(3) 483-503.

NPCC. 2004a. Umatilla River/Willow Creek Subbasin Plan. In Columbia River Basin Fish and Wildlife Program. Portland, OR.

NPCC. 2004b. Grande Ronde Subbasin Plan. In Columbia River Basin Fish and Wildlife Program. Portland, OR.

NPCC. 2004c. Walla Walla Subbasin Plan. In Columbia River Basin Fish and Wildlife Program. Portland, OR.

NWCG. 2017. Interagency Prescribed Fire Planning and Procedures Guide. National Interagency Fire Center. Boise, ID.

NWCG. 2022. Interagency Standards for Fire and Fire Aviation Operations. National Interagency Fire Center. Boise, ID.

ODEQ. 2000. Upper Grande Ronde Subbasin Total Daily Maximum Load (TMDL) and Water Quality Management Plan (WQMP). Oregon Department of Environmental Quality. Portland, OR.

ODEQ. 2001. Umatilla River Basin Total Daily Maximum Load (TMDL) and Water Quality Management Plan (WQMP). Oregon Department of Environmental Quality. Portland, OR.

ODFW. 2005. 2005 Oregon Native Fish Status Report. Oregon Department of Fish and Wildlife. Portland, OR.

Pellant, M., P. Shaver, D.A. Pyke, and J.E. Herrick. 2005. Interpreting indicators of rangeland health, version 4. Technical Reference 1734-6. U.S. Department of the Interior, Bureau of Land Management, National Science and Technology Center, Denver, CO.

Powell, D.C., C.G. Johnson Jr., E.A. Crowe, A. Wells, and D.K. Swanson. 2007. Potential Vegetation Hierarch for the Blue Mountains of Northeastern Oregon Southeaster Washington, and West-Central Idaho. USDA Forest Service Pacific Northwest Research Station General Technical Report PNW-709. Portland, OR.

Quigley, T.M. and S.J. Arbelbide, tech. eds. 1997. An Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins. 4 Vols. USDA Forest Service Pacific Northwest Research Station Gen Tech. Rep. PNW-GTR-405. Portland, OR.

Ruediger, B., J. Claar, S. Gniadek, B. Holt, L. Lewis. S. Mighton, B. Naney, G. Patton, T. Rinaldi, J. Trick, A. Vandehet, F. Wahl, N. Warren, D. Wenger and A. Williamson. 2000. Canada Lynx Conservation Assessment and Strategy. USDA Forest Service, USDI Fish and Wildlife Service, Bureau of Land Management, and National Park Service, Missoula, MT.

Ruggiero, L. F., K.B. Aubry, S.W. Buskirk, [and others]. 1999. Ecology and Conservation of Lynx in the United States. University of Colorado Press and USDA Forest Service Rocky Mountain Research Station Gen. Tech. Rep. RMRS-GTR-30WWW. Niwot, CO.

Schoville, B.J. 2017. Experimental Lithic Tool Displacement Due to Long-Term Animal Disturbance. Archaeological and Anthropological Sciences 11:5879-5891.

Sheley, R.L, K. Goodwin; and M. Rinella. 2017. Mowing to Manage Noxious Weeds. Montana State University Extension Service Agriculture and Natural Resources Guide MT200104AG. Available Online https://store.msuextension.org/Products/Mowing-to-Manage-Noxious-Weeds-MT200104AG__MT200104AG.aspx.

Skovlin, J. 1984. Impacts of Grazing on Wetlands and Riparian Habitat: A Review of Our Knowledge. P. 1001-1103. In Developing Strategies for Rangeland Management. Westview Press. Boulder, CO.

Stankey, G.H., R.N. Clark, B.T. Bormann. 2005. Adaptive Management of Natural Resources: Theory, Concepts, and Management Institutions. USDA Forest Service Pacific Northwest Research Station General Technical Report PNW-GTR-654. Portland, OR.

Stinson, D. 2001. Lynx Recovery Plan. Washington Department of Fish and Wildlife. Olympia, WA.

Stohr, A., M. LeMoine and G. Pelletier. 2007. Walla Walla River Tributaries Temperature Total Maximum Daily Load Study. Washington Department of Ecology Publication No. 07-03-014, Olympia, WA.

Stringham, T., W. Krueger, and P. Shaver. 2003. State and Transition Modeling: An Ecological Process Approach. Journal of Range Manage. 56(2) 106-113.

Synergy Resource Solutions, Inc. 2009. Comprehensive Rangeland Resource Inventory for the Confederated Tribes of the Umatilla Indian Reservation. Synergy Resource Solutions, Inc.

Tetra Tech Inc. 2001. Umatilla River Assessment. Tetra Tech. Bothell, WA.

Thomas, J.W. tech. ed. 1979. Wildlife Habitats in Managed Forests in the Blue Mountains of Oregon and Washington. USDA Forest Service Agricultural Handbook No. 553. Washington, D.C.

Unsworth, J.W., F.A. Leban, E.O. Garton, D.J. Leptich, and P. Zager. 1999. Aerial Survey: User's Manual. Idaho Department of Fish and Game, Boise, ID.

USFS. 2001. Umatilla and Meacham Ecosystem Analysis. USDA Forest Service Pacific Northwest Region, Umatilla National Forest. Pendleton, OR.

USFWS. 2013. Formal Section 7 Programmatic Consultation on BPA's Columbia River Basin Habitat Improvement Program. TAILS No. 01EOFW00-2013-F-0199. United States Fish and Wildlife Oregon Office, Portland, OR

Van Cleve, R. and R. Ting. 1960. The Condition of Salmon Stocks in the John Day, Umatilla, Walla Walla, Grande Ronde, and Imnaha Rivers as Reported by Various Fisheries Agencies. Department of Oceanography University of Washington. Seattle, WA.

West, D. and J. Zakel. 1993. Bull Trout Population Summaries in the Grande Ronde Subbasin. Unpublished Report. Oregon Department of Fish and Wildlife, La Grande, OR.

Winward, A.H. 2000. Monitoring the Riparian Resources in Riparian Areas. USDA, Forest Service, Rocky Mountain Research Station General Technical Report RMRS-GTR-47. Ogden, UT.

Appendix A
CTUIR Weed List

Table A-1. Invasive Plants Known to Occur on the UIR				
Common name	Scientific name	Umatilla County Invasive Weed List Designation	Oregon Invasive Weed List Designation	CTUIR Invasive Weed List Designation
Bachelor's button	*Centaurea cyanus*	-	-	Priority 1-small, isolated infestations, Priority 2-large established infestations
Black locust	*Robinia pseudoacacia*	-	-	Priority 3
Bulbous bluegrass	*Poa bulbosa*	-	-	Priority 3
Bull thistle	*Cirsium vulgare*	–	B-listed	Priority 2
Bur chervil	*Anthriscus caucalis*	-	-	Priority 1-small, isolated infestations, Priority 3-large established infestations
Canada thistle	*Cirsium arvense*	B-listed	B-listed	Priority 1- small, isolated infestations, Priority 3-large established infestations
Catchweed	*Asperugo procumbens*	-	-	Priority 3
Cereal rye	*Secale cereale*	B-listed	-	Priority 3
Cheatgrass	*Bromus tectorum*	-	-	Priority 3
Common bugloss	*Anchusa officinalis*	A-listed	B-listed, T-designated	Priority 1
Common crupina	*Crupina vulgaris*	A-listed	B-listed	Priority 1
Common mullein	*Verbascum thapsus*	-	-	Priority 3
Common teasel	*Dipsacus fullonum*	-	-	Priority 3
Dalmatian toadflax	*Linaria dalmatica*	B-listed	B-listed, T-designated	Priority 1
Diffuse knapweed	*Centaurea diffusa*	B-listed	B-listed	Priority 1- mall isolated infestations, Priority 3-large established infestations
Field bindweed	*Convolvulus arvensis*	-	B-listed, T-designated	Priority 3
Garlic mustard	*Alliaria petiolata*	-	B-listed, T-designated	Priority 1

Table A-1. Invasive Weeds Known to Occur on the UIR Continued.				
Common name	Scientific name	Umatilla County Invasive Weed List Designation	Oregon Invasive Weed List Designation	CTUIR Invasive Weed List Designation
Himalayan blackberry	*Rubus armeniacus*	A-listed	B-listed, T-designated	Priority 1- small, isolated infestations, Priority 3-large established infestations
Houndstongue	*Cynoglossum officinale*	-	B-listed	Priority 3
Jointed goatgrass	*Aegilops cylindrica*	B-listed	B-listed	Priority 3
Kochia	*Bassia scoparia*	B-listed	B-listed	Priority 3
Medusahead	*Taeniatherum caput-medusae*	B-listed	B-listed	Priority 3
Multiflora rose	*Rosa multiflora*	-	-	Priority 1- small, isolated infestations, Priority 3 - large established infestations
Musk thistle	*Carduus nutans*	B-listed	B-listed	
Myrtle spurge	*Euphorbia myrsinites*	A-listed	B-listed	Priority 1
Perennial pepperweed	*Lepidium latifolium*	-	B-listed, T-designated	
Poison hemlock	*Conium maculatum*	B-listed	B-listed	Priority 3
Puncturevine	*Tribulus terrestris*	B-listed	B-listed	
Purple loosestrife	*Lythrum salicaria*	A-listed	B-listed	Priority 1
Rattail fescue	*Vulpia myuros*	-	-	Priority 3
Reed canarygrass	*Phalaris arundinaceae*	-	B-listed, T-designated	Priority 3
Rush skeletonweed	*Chondrilla juncea*	A-listed	B-listed, T-designated	Priority 1
Russian knapweed	*Acroptilon repens*	B-listed	B-listed	Priority 1- small, isolated infestations, Priority 3 - large established infestations
Russian olive	*Elaeagnus angustifolia*	-	-	Priority 1- small, isolated infestations, Priority 2-large established infestations
Russian thistle	*Salsola kali*	-	-	Priority 3
Scotch thistle	*Onopordum acanthium*	B-listed	B-listed	Priority 2
Smooth brome	*Bromus inermis*	-	-	Priority 3

Table A-1. Invasive Weeds Known to Occur on the UIR Continued.				
Common name	Scientific name	Umatilla County Invasive Weed List Designation	Oregon Invasive Weed List Designation	CTUIR Invasive Weed List Designation
Spikeweed	*Centromadia pungens*	A-listed	B=Listed	Priority 1
Spotted knapweed	*Centaurea stoebe*	A-listed	B-listed, T-designated	Priority 1
Spreading hedge-parsley	*Torilis arvensis*	-	-	Priority 2
St. Johnswort	*Hypericum perforatum*	B-listed	B-listed	Priority 3
Sulfur cinquefoil	*Potentilla recta*	-	B-Listed	Priority 1- small, isolated infestations, Priority 3 - large established infestations
Swainson pea	*Sphaerophysa salsula*	-	B-Listed	Priority 2
Sweetbriar rose	*Rosa eglanteria*	-	-	Priority 3
Tall oatgrass	*Arrhenatherum elatius*	-	-	Priority 3
Tansy ragwort	*Senecio jacobaea*	A-listed	B-Listed	Priority 1
Tree of heaven	*Ailanthus altissima*	-	B-Listed	Priority 1
Ventenata	*Ventenata dubia*	-	-	Priority 3
Viper's bugloss	*Echium vulgare*	A-listed	-	Priority 2
Whitetop (hoary cress)	*Cardaria draba*	B-listed	-	Priority 1
Yellow flag iris	*Iris pseudacorus*	A-listed	B-listed	Priority 1
Yellow starthistle	*Centaurea solstitialis*	B-listed	B-listed	Priority 1- small, isolated infestations, Priority 2 - large established infestations

NOTES:
A-listed: A weed of known economic importance that occurs in the state/county in small enough infestations to make eradication or containment `possible; or is not known to occur, but its presence in neighboring states/county make future occurrence in seem imminent.
B-listed: A weed of economic importance, which is regionally abundant, but which may have limited distribution in some counties.
T-designated: A designated group of weed species that are selected and will be the focus for prevention and control. Action against these weeds will receive priority.
Priority 1 Species. An invasive weed with small infestations in the IWMP management area that are quick to spread, and/or are difficult to control. Eradication will be the primary management strategy. Priority 1 species are the highest priority for treatment; eradication will likely require repeated treatments.
Priority 2 Species. An invasive weed that is limited in abundance, but widespread in the IWMP management area. Reduction will be the primary management strategy for Priority 2 species. Annual treatment may be needed to prevent more severe infestations.
Priority 3 Species. An invasive weed that is already widespread in the IWMP management area, and will thus be costly to control, or is considered less invasive than Priority 1 or Priority 2 species. Treatment of Priority 3 species will be focused along roads and other vectors for containment and to prevent the population from spreading.